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## THE FIFTEENTH EDUCATIONAL CONFERENCE OF THE ACADEMIES AND HIGH SCHOOLS AFFILI- ATING OR COÖPERATING WITH THE UNIVER- SITY OF CHICAGO

### I. EXECUTIVE SESSION OF DEANS AND PRINCIPALS

THE fifteenth educational conference of the academies and high schools affiliating or coöperating with the University of Chicago opened as usual on November 8 with the executive session of deans and principals of the secondary schools with the board of affiliations of the university. Certain committees had been appointed at the fourteenth conference to present further reports upon questions which were discussed at some length at that meeting.

#### SEPARATION OF STUDENTS INTO SECTIONS UPON BASIS OF SCHOLARSHIP

The fourteenth conference had expressed a favorable opinion with reference to the separation of students into sections upon the basis of scholarship, and appointed a committee to make suggestions for the practical carrying out of this plan. Mr. J. O. Leslie reported for the committee the following recommendations:

1. That where the classes entering high schools are large enough to make three or more sections, of say thirty pupils each, these sections be based temporarily on scholarship as shown by the work done in the grades in mathematics and language study.

2. That after pupils have been in the high school for a period of two months a reclassification be made, if necessary, based upon the pupil's high-school record in two continuous studies, *e. g.*, Latin and algebra.

3. That where the difficulties of separation are not too great, it be maintained through the second year, and in some studies, say mathematics, through the third, thus allowing those whose ability is approximately equal to advance in accordance with their ability.

4. Your committee earnestly recommends that, so often as may be advisable, the teacher meet the slower sections caused by the plan of separation, and the slower pupils in all the sections where such separation is not practiced, and with them go over the work proposed for the regular class work, discussing its difficulties, suggesting the best methods of overcoming the same, so that they may come to a better comprehension of the work they are trying to do.

After a full consideration of the report, in which the discussion bore not so much upon the details for the carrying out of the plan, as upon the plan itself, it was ascertained by an informal vote that the present conference was not in favor of the separation into sections upon the basis of scholarship. The report of the committee was accepted and ordered placed on file.

The second committee, following the printed order, reported as follows:

#### PLACE OF GENERAL HISTORY IN SCHOOLS

Your committee appointed to consider the following resolution, "That it is the sense of this conference that general history, so-called, should not have a place in our secondary schools; but that even when one year only is devoted to history it should be given to some important division of the subject," would respectfully report that, after a careful consideration of the questions involved, they would answer both propositions in the resolution in the negative, viz., that general history so-called *should* have a place in our secondary schools, but should extend over at least two years, and that when only one year is devoted to history it should not be given to some important division of the subject.

The committee would heartily disapprove of any course of study which permits only one year of history work, and would not be understood, in anything that follows, to sanction directly or indirectly, such a course.

The committee believes that the importance and value of the study of history cannot be overestimated, and would most cordially indorse the report of the Committee of Seven, which recommends a four-year course in history as follows:

*First year*—Ancient history to 800 A. D.

*Second year*—Mediæval and modern European history.

*Third year*—English history.

*Fourth year*—American history and civics.

One member of the committee prefers a three years' course, and the rest concur, where a full four years' course is not practicable. The three years course is the one recommended by the Committee of Seven, as follows:

*Second year of high school*.—Ancient history to 800 A. D.

*Third year*.—English history with special reference to the chief events in the history of continental Europe.

*Fourth year*.—American history and civics.

The committee is agreed that it is desirable to introduce into the course in history the elements of the study of sociology and would recommend that steps be taken by this conference looking toward this end.

In regard to the second part of the resolution, which contains the question most liable to be controverted, the committee is very clear in the opinion that general history should be taught in preference to the history of any isolated period, where there is time for only one, but there is some difference of opinion as to its place in the course, one or two members of the committee believing it should come at least as late as the third year, while another would have it come earlier in order to reach the largest possible number of students.

The reasons which have led the committee to this decision are very briefly as follows:

1. There are many great facts and persons in general history with which every well-informed person must be familiar in order that he may understand the numerous allusions which he will come across in the course of his reading and in his daily life. Without this general information he will be wholly at a loss to understand the life conditions by which he is surrounded, both in their causes and their tendencies. This information cannot be obtained in any other way than by a general survey of the world's history; and in general it will not be secured at all unless such a course is provided in the schools. It is far more important that the student should be measurably familiar with the great sweep of history and the movements which have laid the foundations of civilizations and promoted its progress, than that he should have studied with more care the comparatively unimportant and limited life of far-away Greece and Rome. Even if he secures a better discipline (which is not certain), and acquires a taste for going to original sources (the value of which is at least questionable), it certainly cannot compensate for his entire ignorance of the great realm of history outside of this area. The simple statement of this condition seems to the committee to be conclusive.

2. The second reason is not utilitarian, but is based upon the nature of historic materials, and the method of presentation which they seem to demand inherently. It is not possible to present this argument satisfactorily within the limits of a report of this kind, but roughly and categorically it may be stated as follows:

History is an organic unit, and not an assemblage or succession of isolated or incoherent units. It must be remembered that history is not mainly or primarily a record of facts, but that it is the story of human life, as it has gradually developed in individual character and human institutions. In each generation is summed up the results of all the vital processes of human life from the very beginning, nor can its social and civic conditions be satisfactorily studied except in the light of bygone centuries. Thus the study of history rightly becomes the study of human life and society as the increasing product of evolutionary forces acting under laws which are fixed, and thus have been operative from the beginning of all things.

If this is true then history is a science, and must be taught by methods which will submit themselves to scientific tests. From this standpoint it may easily be shown that the study of history by isolated periods is unscientific and totally inadequate. It violates the generally accepted canons of scientific research, and is certainly out of harmony with what has come to be almost a pedagogical axiom, that any subject should be presented as a whole—in its entirety—before any part of it becomes the object of special research or intensive study.

Upon these considerations the conclusions of this committee have been based.

Respectfully submitted,

C. W. FRENCH,

B. F. BUCK,

A. A. REED,

A. W. SMALL,

*Committee.*

#### THE QUESTION OF SCHOOL AND COLLEGE ATHLETICS.

Your committee, appointed a year ago, to consider the questions proposed by Principal C. W. French, wishes hereby to report as follows:

##### I. The relation of athletics to the school or institution.

1. Athletics can no longer be conducted as a recreation without supervision. The instinct of contest, for supremacy, has created such competition that, without supervision, pupils will develop unfair tactics and go beyond the bounds of safety.

2. Athletics are certainly for all, but not all kinds of athletics are for every pupil, any more than all studies taught are for every pupil, or all kinds of food for every stomach.

3. While doubtless some football enthusiasts rank college standing by punts and goals, it would be as unfair to charge institutions of learning with such views as to claim that they give credit toward graduation for hazing.

##### II. In relation to control.

1. Athletics should not and cannot be prohibited. Children's play cannot be prohibited; neither can courtship. These are instincts of humanity.



Football is a form of athletics that is of most interest to healthy vigorous young men, because it calls for the greatest amount of generalship, strategy, concerted action, self-control, and physical vigor.

2. Athletics should be encouraged under proper control, because it calls forth the exercise of the manly faculties enumerated.

3. Athletics should not be allowed to dominate school and college life. We may differ as to what constitutes "dominating." Though the main business of the institution goes on as serenely in the class room as the most scholarly might desire, if a crowd of enthusiastic students from the same class room cheer at a football game, the inference is immediately drawn that football dominates the institution. Both work and play have their function, and one cannot take the place of the other.

### III. The extent of control.

1. Credit should be given for all systematic work done under faculty supervision. Credit for athletics, be it ever so small, will give it the dignity of work to be well done, and will remove the objection raised to faculty control.

2. As athletics are for recreation and physical development, they should be *subservient* to intellectual development. To this end, no one should be permitted to represent an institution in athletics who is not carrying his school work. He may still have athletics, but not that part in which he represents his school. Such honors must be reserved for those who do the work in the class room.

3. Since young people are apt to be carried beyond proper bounds by their enthusiasm, all such contests should be directed and controlled by a conservative body. In the high school the faculty should be that controlling body.

4. If a passing average is not maintained in every study, the whole case will go "by the board." High marks with one teacher should not effect low marks with another. Such an arrangement will only promote sharp practice and defeat the object of proper relations. No matter how severe the physical training may be, no one should be permitted to represent a school in athletics who is not carrying fifteen hours of regular school work per week. To let this down to a general average of 75 per cent. is to offer a temptation to professionalism.

### IV. Safeguards that should be provided.

1. A physician's certificate. The recent examination of the physical condition of the young men who aspired to play football in our Chicago high schools showed that 12 per cent. of them should not be permitted to play at the risk of their lives, by reason of heart failure, due to organic defects. This first attempt at such a regulation shows the wisdom of the rule. The parents' consent places the responsibility where it belongs. Enclosed grounds prevent the spectators from interfering with the game, and give both sides fair play. It is unreasonable to expect that a fair contest can be held under other conditions.

2. No radical change seems possible under the rules of the game at present whereby the dangers of accident may be entirely eliminated. To make it as safe as marbles would be desirable if it did not at the same time rob the game of all interest. It does not follow, however, that the great interest in football is the danger to life and limb. Life is full of dangers from the cradle to the grave, and yet no one would claim that it is on account of these dangers that life is desirable. The association game has been proposed as a substitute for our American game, but this can no more be done than a "pink tea" can take the place of ham and eggs in the case of the day laborer. The association game is a kind of free for all, go-as-you-please game that calls for very little training or skill; the other calls for the highest type of athletic specialization.

3. There is no more danger from moral deterioration on account of football than from secret societies or dancing parties. Competent officials should be provided who will rule a player off the field for swearing or using objectionable language or losing his temper.

4. Championships and banners are desirable if fairness and honesty prevail. They are the emblems of victory, and are essential to the spirit of contest.

5. Suppression of the athletic tendencies of pupils will not raise the ideals of scholarship. Men once denied themselves food and sleep as a means of promoting moral growth. Fortunately, they have passed on to a world where food, sleep, and exercise are not needed so far as we are aware. We need to prepare men to live in the body and so the physical must be cared for. We should teach the young, however, that mental victories are greater than physical, and moral victories greater than either; but not that intellectual and moral victories are to be gained by suppressing our physical being.

6. The time has indeed come when schools and colleges should recognize the need of fully directing the athletic interests of these institutions. For this reason the high schools of the state recently formed an association and adopted rules governing the eligibility of players and provided means for deciding protests. A copy of the rules is hereby submitted as a part of this report:

SECTION 1. No person shall be qualified to represent any school under this agreement, in any athletic contest with members of another school or schools belonging to this association, unless he shall have been enrolled as a member of that school from the beginning of the third week of the semester in which the contest or events take place. By the "beginning of the semester" is meant the first week of school in September and February of each year.

SEC. 2. No person who has represented any school in an inter-school contest in any capacity during a semester, and whose school connection has lapsed, shall be again eligible to represent such school in any athletic capacity, until he shall have successfully carried the work of the semester lapsed; expulsion, suspension for one week or more, or absence for more than two weeks for any reason other than disabling sickness, shall be deemed "lapse of school connection" under this rule.

SEC. 3. No person shall be allowed to represent his school in athletics, in any capacity whatever, unless he shall be doing passing work in at least fifteen regular periods weekly, of recitation work; said work to be determined from the teachers' reports, according to the regular method of the school.

SEC. 4. Any person taking part in athletics and failing to pass in ten hours' work during that semester shall be declared ineligible to play another semester until that amount of work shall have been passed.

SEC. 5. *No post-graduate* shall play on any school team or contest in any athletic event between schools belonging to this association.

SEC. 6. *No person over twenty-one* years of age shall be allowed to represent any school in an athletic contest.

SEC. 7. *No boxing* event shall be allowed in any of the inter-school contests.

SEC. 8. A principal's *certificate* as to the standing of the representative of a school under this agreement shall be required before every contest.

SEC. 9. No person shall participate in any inter-school contest who has ever used or is using his knowledge of *athletics or athletic skill for gain*.

SEC. 10. No person shall be allowed to represent any school in a contest in football who has not within a period of twelve weeks preceding such contest, furnished his principal with a *physician's certificate* stating that he has personally examined the applicant as to his physical condition, and that in his judgment the applicant is in sound health and able to take severe exercise without undue risk.

SEC. 11. No person shall play on any school team or contest in any athletic event *for more than four years*.

SEC. 12. The Board of Control shall furnish blank certificates to all schools belonging to this association.

SEC. 13. The principals of the schools contesting shall *exchange certified lists* of eligible contestants at least *one week before each contest between schools*. They shall furnish the managers of any organization holding a contest or meet under the rules of this association, a *certified list of eligible contestants one week before* such contest or meet.

SEC. 14. It shall be the duty of the secretary-treasurer to furnish all schools, from time to time, with an official list of the schools belonging to this association.

SEC. 15. The officers shall prepare a form of agreement to be signed by the principal of each school at the time application is made for membership in this association. These agreements shall be kept on file by the secretary.

SEC. 16. No person shall contest or take part in any *athletic contest under an assumed name*.

#### RECOMMENDATIONS

1. It is recommended that a member of the faculty accompany each team on its trips.

2. It is recommended that the parent's or guardian's consent, in writing, should be required before any person shall be eligible to play football on any school team.

3. It is recommended that the Board of Managers secure competent officials who are not graduates or former pupils of either of the schools engaged in the contest.

4. It is recommended that all universities conducting athletic contests between high schools require all contestants to compete under the rules of this association.

5. It is recommended that the Amateur Athletic Union adopt the rules of this association governing the eligibility of contestants from all high schools of the state.

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3. It is recommended that the Board of Managers secure competent officials who are not graduates or former pupils of either of the schools engaged in the contest.

4. It is recommended that all universities conducting athletic contests between high schools require all contestants to compete under the rules of this association.

5. It is recommended that the Amateur Athletic Union adopt the rules of this association governing the eligibility of contestants from all high schools of the state.

Your committee would therefore respectfully offer the following resolutions:

WHEREAS, many abuses of amateur athletics have developed in our schools and universities for lack of proper regulations by conservative controlling bodies, and whereas such control has been undertaken among high schools by high-school athletic associations, and among universities by a conference of representatives; therefore be it

*Resolved*, That it is the sense of this conference that we discourage all athletic contests between schools or colleges not under local or state boards of control.

*Resolved*, That we respectfully request all universities and colleges to hold no athletic meets or contests for high schools except under the rules of state or local boards of control, regularly organized; and be it further

*Resolved*, That we hereby endorse the action of Superintendent E. G. Cooley, in requiring all contestants in football to furnish a physician's certificate and the parent's consent, and to maintain a passing average in all studies, provided this shall mean not less than fifteen hours a week, in order to be permitted to play on a regular team; and be it finally

*Resolved*, That we cordially recommend this last resolution to superintendents of schools and boards of education.

Respectfully submitted,

J. E. ARMSTRONG.  
SPENCER R. SMITH.  
A. V. GREENMAN.

A new topic, "The Relative Merits of the Semester and Quarter Systems in Secondary Schools," was next considered. The following brief was presented by Superintendent J. Stanley Brown, of the Joliet Township High School:

#### THE QUARTER SYSTEM IN SECONDARY SCHOOLS

By the quarter system in secondary schools, I understand that in which provision is made for all subjects mentioned in the curriculum to begin three times a year, and for the reception of incoming students three times a year. I shall proceed on this basis.

I have no knowledge of any secondary school whose plan of work includes the quarter system, and whose curriculum contemplates the addition of students at regular intervals three times a year. So, what I say will not be based entirely on experience and observation, but rather on deductions made from the annual and semester systems of promotion.

The annual system, which provides for the admission of pupils once a year, represents one extreme in promotion; the district school,

in which promotion or demotion may take place at the close of any week, represents the other. The former exalts the class instruction and debases the individual instruction; the latter exalts the individual instruction and debases the class instruction.

The golden mean is often thought to be in the semester system, but with the redistribution of pupils and the consequent forming of slow and fast divisions in various subjects, for pupils who entered at the same time, the semester system differs very little from the quarter system, if, indeed, it differs at all.

It seems to me the fundamental reason for making a way to admit pupils two or three times a year is that, almost without exception, such a scheme benefits the average pupil and those below the average. Neither the annual system nor the quarter system affects the strong student. He can stand in spite of the curriculum, but the weaker student, who finds at the close of the first term that he is unable, for reasons purely intellectual, to go on with his class, hails with joy the opportunity to enter a new class where he may review the work and yet have a chance to recover himself and graduate with his class. If this new class, which the quarter system provides, is not awaiting him he drags along at a dying rate till the semester closes, and then, disgusted with himself and the school, goes out.

The average pupil, who finds his work pretty hard, easily persuades himself that he can make an unusual effort because the period over which the extra nerve tension is to extend is short, whereas, if he must look forward to a year's work or even a semester's work, he is inclined to think that he cannot pass, and hence will not make a trial.

The quarter system necessitates a larger number of teachers than either the semester or the annual system. This condition has its advantage in the fact that instructors may then be chosen to do certain specific lines of work, covering not more than two subjects related to each other. Teachers chosen in such a manner do much more satisfactory work, and hence in this respect the quarter system may be pronounced all right.

The state law requires ten weeks' work in physiology to be given in the first year of the high school. The quarter system makes it easy to keep this unpopular law without any interference with other work of the school.

There is quite a large number of educators who look upon secondary work in extension rather than intension. They reverse the proverb so that it reads "not much, but *many things*." These men would



have not a few subjects pursued for one, two, three, or four years in the secondary school, but many subjects pursued for a quarter, and at most a quarter and a half. They would have the young people, so it is said, obtain a broad foundation for their educational structure. This end is accomplished beyond question, but in the effort to become broad the foundation had become so thin it would scarcely cast a shadow. Now the quarter system furnishes an admirable means of furnishing a broad foundation, for three or four new subjects may be begun and finished each quarter.

Now that many schools have courses wholly or in part elective, the quarter system may be looked upon with favor, because so many young people know much better what they want, or rather what they don't want, after the study has been pursued three months. The quarter system enables them to begin again, and thus recover themselves before it is too late.

Students are found in all secondary schools who are dependent upon their own resources; and, while this number is small, the quality of work done by them ranks high, and the personal worth of the individual is far above the average of the school. Now the quarter system is for this somewhat small class of students a great inducement to enter school and complete a course. The fact that this system permits them to work whatever portion of the year employment seems easiest to secure, and then to enter classes beginning a subject, or at least taking it up at a point well-known to the entering student, is a consideration weighty enough in itself to draw into school many who could not attend under other conditions, and to hold in school some who, under less favorable conditions, would drop out of school.

The quarter system in secondary schools favors the young men and women who enter professional schools conditioned in some study or studies, because they may attend the professional school the six months required and then enter the lower school at the beginning of the next quarter and have their conditions removed by the next year of their professional training.

The quarter system seems to favor students who have poor health, because instead of going to the close of the third month and being compelled to loose the credit for the work done, for failing to complete the required amount, he does get credit under the quarter system, and is at liberty to remain out for recuperation the following quarter.

The quarter system is its own defense in the case of students intending to enter colleges or universities in which the quarter system



is in force, because the student is not compelled to wait until September or October before entering, but may begin his work at once. So it would seem that there is economy of time and energy in the quarter system.

To summarize this discussion we give the following in favor of the quarter system: (1) It gives an opportunity for the student to recover himself before he has gone so far as to make recovery impossible. (2) The period is so brief that even a lazy student persuades himself he can endure, whereas if the period were two or three times as long he would not make a trial. (3) It gives better opportunity to assign work to teachers according to special fitness. (4) It makes it easy to keep the state law concerning physiology. (5) It finds a way to satisfy all who wish a broad foundation laid in secondary schools. (6) It gives valuable assistance in working out the elective system of studies. (7) It is an aid to students working their way through school. (8) It favors those entering professional schools on condition. (9) It works to the advantage of those who drop out of school because of ill-health. (10) It is its own defense in case of students entering universities having the quarter system.

Dean Miller of the Board of Affiliations of the University then presented the following facts relative to the granting of advanced standing in the University of Chicago for work done by students in secondary schools:

*1. General principles governing advanced standing.*

1. The university recognizes (a) that it is possible for a student in a first-class secondary school to accomplish more in his four years of study in such a school than the fifteen units required for admission to the university; (b) that it is proper that such extra work should be credited toward a college degree where it is comparable in amount and quality with similar work required in the college. Such credit is in this paper termed advanced standing of the first class.

2. The university further recognizes that certain departments in certain schools are so excellently equipped that the privilege may safely be extended to these departments of giving instruction to post-graduate students in subjects which are not common to the secondary school and the college, but which are found only in the junior college required curriculum; and of recognizing for credit such instruction after proper examination. Such credit is here termed advanced standing of the second class.

3. It is held that no student has any claim for advanced standing so long as there is any condition, either quantitative or qualitative, outstanding against him.

## II. *The practical administration of these principles.*

1. Advanced standing of the first class. (a) Owing to the assumed difference in age between the secondary and college student, and the consequent greater immaturity of the former at the time when the subject in question was pursued, credit for advanced standing is given at the ratio of 2 to 3; that is, for one unit of work in the secondary school, two majors of credit in college are allowed. (b) The subjects which are common to school and college curricula are history (mediæval and modern), French, and German. (c) In case of students from affiliated schools, whose examinations in course are set, read, and graded by the university itself, advanced standing for excess credit in these subjects is assigned upon the students' entrance without further examination. (d) Students from coöperating schools whose work has not been so examined are given a statement of claim for advanced standing upon their admission to the university, which claim they are required to present to the departmental examiner and make good this claim by such examination as he may require.

2. Advanced standing of the second class. The university recognizes for credit distinctive college work in the secondary school under the following conditions: (a) That this shall be of the nature of post-graduate work, the student having previously completed all units required for admission. (b) That the departmental examiner shall have approved the work as offered. (c) That the student shall pass the university examination upon the course in question.

The subjects hitherto offered under these conditions are: third year Greek (Homer), junior college Latin, junior college mathematics, and the required course in rhetoric, styled in the junior college English 1.

## III. *Some results of this system.*

Of the students who entered the university from the secondary schools, October 1, 1900, fifty-three had claim for advanced standing in the different subjects of both classes mentioned above. Of these, eighteen received credit upon their claim after examination. It would appear that in most cases the claims were not presented to the departmental examiners, but were allowed to go by default.

On October 1, 1901, thirteen students from affiliated schools received without further examination credit aggregating forty majors. This was given largely in French and German, with some additional credits in college Latin, mathematics, and English. On the same date the claims for advanced standing of over forty students from coöperating schools were recognized, largely in German, French, and trigonometry. The returns upon the claims have not yet been received.

The president appointed the following committee on program for the next conference: Superintendent A. V. Greenman, W. Aurora, *chairman*, President Ellen Sabin, Milwaukee; Principal C. W. French, Chicago; Dean W. B. Owen, Chicago; Principal D. O. Barto, Princeton; Principal A. J.

Volland, Grand Rapids; Director Nathaniel Butler, and Dean F. J. Miller, of the University.

## II. THE CONTEST IN DECLAMATION.

An unusual interest was shown in this contest by the secondary schools, candidates being sent from a wide range of places as follows: from Chicago: the Englewood, Medill, Hyde Park, South Chicago, South Division, Marshall, and Austin High Schools, also Kenwood Institute, South Side Academy, and Morgan Park Academy; from outside of Chicago: the Elgin, St. Joseph (Mich), Rockford, Joliet Township, Clyde Township, West Aurora, Kansas City (Central), Pueblo (Centennial), Kansas City (Manual Training), Waukegan, Bloomington, and Evanston High Schools, also Bradley Polytechnic Institute, Girl's Classical School (Indianapolis), and Wayland Academy.

The winner of the prize scholarship in the class for girls was Margie Anne Taylor, of the Girls' Classical School; in the class for boys was Sherwood Fender, of the Kansas City Central High School.

## THE GENERAL CONFERENCE.

The general conference on Saturday morning considered the topic: "Current Problems in Secondary Education." The leading paper in the discussion was presented by Professor John Dewey, of the University. His paper with syllabus follows.

### CURRENT PROBLEMS IN SECONDARY EDUCATION.

I should feel hesitant indeed to come before a body of teachers, engaged in the practical work of teaching, and appear to instruct them regarding the solution of the difficult problems which face them. My task is a more grateful one. It is mine simply to formulate and arrange the difficulties which the current state of discussion shows teachers already to have felt. Those concerned with secondary-school work have realized that their energies must be peculiarly concentrated at certain points; they have found that some problems are so urgent that they must be met and wrestled with. I have tried in the accompanying syllabus to gather together these practical problems and to arrange them in such form as to show their connections with one another; and by this classification to indicate what seem to me the roots of the difficulty.

I. *Problems relating to the articulation of the secondary school in the educational system.*

1. Adjustment to the grades.
  - a) Dropping out of pupils: extent and causes.
  - b) Different sorts of preparation for teachers; methods of rectifying, etc.
  - c) Abrupt changes of ideals and methods of teaching and discipline.
  - d) Introduction of traditional high-school studies into the upper grades; the science course, etc.
2. Adjustment to college.
  - a) Modes of entering college; examination, certification, etc.
  - b) Varieties of entrance requirements.
  - c) Different problems of public and private high schools.
  - d) Coaching for specific results *vs.* training and method.

II. *Problems relating to the adjustment of preparation for college to preparation for other pursuits in life.*

1. Is it true that the same education gives the best preparation for both?
2. If so, which shall be taken as the standard for measuring the character of the other?
3. If not so, by what principles and along what lines shall the work be differentiated?
4. If not so, shall specialized or definite preparation be made for other future callings as well as for the college student?

III. *The adjustment of work to the individual.*

1. The nature and limits of the elective principle as applied to particular subjects, and to courses and groups of subjects.
2. Acquaintance with the history, environment, and capacity of individuals with reference to assisting in the selection of vocation.
3. Does the period of adolescence present such peculiarities as to call for marked modifications of present secondary work?

IV. *Problems arising from social phases of secondary school work.*

1. The educational utilization of social organizations: debating, musical, dramatic clubs; athletics.
2. School discipline and government in their social aspect.
3. Relations to the community: the school a social center.

V. *Preceding problems as affecting the curriculum: conflict of studies and groups of studies.*

1. The older problem: adjustment of the respective claims of ancient and modern languages, of language and science, of history and social science, civics, economics, etc., of English literature and composition.
2. The newer problem.
  - a) The place of manual training and technological work.
  - b) The place of fine art.
  - c) Commercial studies.

In what I have to say this morning, I shall make no attempt to go over these points one by one. I shall rather try to set clearly and

briefly before you the reasons which have led me to adopt the classification presented. This will take me into a discussion of the historic and social facts which lie back of the problem, and in the light of which alone I believe these problems can be attacked and solved. If it seems unnecessarily remote to approach school problems through a presentation of what may appear to be simply a form of social philosophy, there is yet practical encouragement in recognizing that exactly the same forces which have thrust these questions into the forefront of school practice are also operative to solve them. For problems do not arise arbitrarily. They come from causes, and from causes which are imbedded in the very structure of the school system—yes, even beyond that, in the structure of society itself. It is for this reason that mere changes in the mechanics of the school system, whether in administration or in the externals of subject-matter, turn out mere temporary devices. Sometimes, when one has made a delicate or elaborate arrangement which seems to him exactly calculated to obviate the difficulties of the situation, one is tempted to accuse his generation as stiff-necked when the scheme does not take—when it does not spread; when, in the language of the biologist, it is not selected. The explanation, however, is not in the hard-heartedness or intellectual blindness of others, but in the fact that any adjustment which really and permanently succeeds within the school walls, must reach out and be an adjustment of forces in the social environment.

A slight amount of social philosophy and social insight reveals two principles continuously at work in all human institutions: one is toward specialization and consequent isolation, the other toward connection and interaction. In the life of the nation we see first a movement toward separation, toward marking off our own life as a people as definitely as possible to avoid its submergence, to secure for it an individuality of its own. Commercially we pursue a policy of protection; in international relations one of having to do as little as possible with other nationalities. That tendency exhausts itself and the pendulum swings in another direction. Reciprocity, the broadening of our business life through increased contacts and wider exchange becomes the commercial watchword. Expansion, taking our place in the sisterhood of nations, making ourselves recognized as a world-power, becomes the formula for international politics. Science shows the same rhythm in its development. A period of specialization—of relative isolation—secures to each set of natural phenomena a chance to develop on its own account, without being lost in, or obscured by

generalities or a mass of details. But the time comes when the limit of movement in this direction is reached, and it is necessary to devote ourselves to tracing the threads of connection which unite the different specialized branches into a coherent and consecutive whole. At present the most active sciences seem to be spelled with a hyphen; it is astro-physics, stereo-chemistry, psycho-physics, and so on.

This is not a movement of blind action and reaction. One tendency is the necessary completion of the other. A certain degree of isolation of detachment is required to secure the unhindered and mature development of any group of forces. It is necessary in order to master them in their practical workings. We have to divide to conquer. But when the proper degree of individualization is reached, we need to bring one thing to bear upon another in order to realize upon the benefits which may be derived from the period of isolation. The sole object of the separation is to serve as a means to the end of more effective interaction.

Now as to the bearings of this abstract piece of philosophy upon our school problems. The school system is a historic evolution. It has a tradition and a movement of its own. Its roots run back into the past and may be traced through the strata of the successive centuries. It has an independence, a dignity of its own comparable to that of any other institution. In this twenty-five-hundred-year-old development it has, of necessity, taken on its individuality at the expense of a certain isolation. Only through this isolation has it been disentangled from absorption in other institutions: the family, the government, the church, and so on. This detachment has been a necessity in order that it might become a true division of labor and thus perform most efficiently the service required of it.

But there are disadvantages as well as advantages. Attention has come to be concentrated upon the affairs of the school system as if they concerned simply the system itself, and had only a very indirect reference to other social institutions. The school-teacher often resents reference to outside contacts and considerations as if they were indeed outside—simply interferences. There can be no doubt that in the last two centuries much more thought and energy have been devoted to shaping the school system into an effective mechanism within itself than to securing its due interaction with family life, the church, commerce, or political institutions.

But, having secured this fairly adequate and efficient machine, the question which is coming more and more to the front is: What shall

we do with it? How shall we secure from it the services, the fruits, which alone justify the expense of money, time, and thought in building up the machine?

It is at this point that particular conflicts and problems begin to show themselves. The contemporary demands—the demands that are made in the attempt to secure the proper interaction of the school—are one thing; the demands that arise out of the working of the school system considered as an independent historical institution are another. Every teacher has to work at detailed problems which arise out of this conflict, whether he is aware of its existence or not, and he is harassed by friction that arises in the conflict of these two great social forces. Men divide along these lines. We find one group instinctively rather than consciously ranging itself about the maintenance of the existing school system, and holding that reforms are to be made along the line of improvement in its present workings. Others are clamorous for more radical changes—the changes that will better adapt the school to contemporary social needs. Needless to say, each group represents a necessary and essential factor in the situation, because each stands for the working of a force which cannot be eliminated.

Let me now try to show how, out of this profound social conflict and necessity of social adjustment, the particular problems arise which I have arranged under five heads in the accompanying syllabus. Our first concern is with the articulation of the high school into the entire educational system. The high school looks towards the grades on one side and toward the college on the other. What are the historic influences which have shaped this intermediate position, and placed peculiar difficulties and responsibilities upon the secondary school? Briefly put, it is that the elementary school and the college represent distinctly different forces and traditions on the historic side. The elementary school is an outgrowth of the democratic movement in its ethical aspects. Prior to the latter half of the eighteenth century the elementary school was hardly more than a wooden device for instructing little children of the lower classes in some of the utilities of their future callings—the mere rudiments of reading, writing, and number. The democratic upheaval took shape not merely in a demand for political equality, but in a more profound aspiration towards an equality of intellectual and moral opportunity and development. The significance of such an educational writer as Rousseau is not measured by any particular improvement he suggested, or by any par-



ticular extravagances he indulged himself in. His is a voice struggling to express the necessity of a thoroughgoing revolution of elementary education to make it a factor in the intellectual and moral development of all—not a mere device for teaching the use of certain practical tools to those sections of society before whose development a stone wall was placed. What Rousseau as a writer was to the emotions of the France of his day, Horace Mann as a doer was to the practical situation of the United States in his time. He stood, and stood most effectively, for letting the democratic spirit, in all of its ethical significance, into the common elementary schools, and for such a complete reorganization of these schools as would make them the most serviceable possible instruments of human development.

In spite of all the influences which are continually operative to limit the scope and range of elementary education, in spite of the influences which would bring back a reversion to the type of the limited utilitarian school of the seventeenth century, that part of the school system which stands underneath the high school represents this broad democratic movement. To a certain extent, and in many of its phases, the high school is an outgrowth of exactly the same impulse. It has the same history and stands for the same ideals; but only in part. It has also been profoundly shaped by influences having another origin. It represents also the tradition of the learned class. It maintains the tradition of higher culture as a distinct possession of a certain class of society. It embodies the aristocratic ideal. If we cast our eyes back over history we do not find its full meaning summed up in the democratic movement of which I have just spoken. We find the culture of the ancient world coming down to us by a distinct channel. We find the wisdom and enlightenment of the past conserved and handed on by a distinct class located almost entirely in the colleges, and in the higher academies which are to all intents and purposes the outgrowth of the colleges. We find that our high school has been quite as persistently molded and directed through the agencies which have been concerned with keeping alive and passing on the treasure of learning, as through the democratic influences which have surged up from below. The existing high school, in a word, is the product of the meeting of these two forces, and upon it more than upon any other part of the school system is placed the responsibility of making an adjustment.

I do not mention the tradition of learning kept up in the universities of the Middle Ages and the higher schools of the Renaissance,



and refer to it as aristocratic for the sake of disparaging it. Eternal vigilance is the price of liberty, and eternal care and nurture are the price of maintaining the precious conquest of the past—of preventing a relapse in Philistinism, that combination of superficial enlightenment and dogmatic crudity. If it were not for the work of an aristocracy in the past, there would be but little worth conferring upon the democracy of today.

There are not in reality two problems of articulation for the high school—one as regards the grades and the other as regards the college. There is at bottom but one problem—that of adjusting the demand for an adequate training of the masses of mankind to the conservation and use of that higher learning which is the primary and essential concern of a smaller number—of a minority. Of course, elementary school and college alike are affected by the same problem. Part of the work of the grades today is precisely the enrichment of its traditional meager and materialistic curriculum with something of that spirit and wealth of intelligence that are the product of the higher schools. And one of the problems of the college is precisely to make its store of learning more available to the masses, make it count for more in the everyday life.

But the high school is the connecting link, and it must bear the brunt. Unless I am a false prophet, we shall soon see the same thoughtful attention which for the past fifteen years has characterized discussion of the relation of high school and college, speedily transferring itself over to the problem of a more organic and vital relation between the high school and the grades. The solution of this problem is important in order that the democratic movement may not be abortively arrested—in order that it may have its full sweep. But it is equally important for the sake of the college and in the interests of higher learning. The arbitrary hiatus which exists at present reacts as unfavorably in one direction as in the other.

First, it limits the constituency of the college; it lessens the actual numbers of those who are awakened to the opportunities before them, and directed towards the college doors. Secondly, it restricts the sphere of those who sympathetically and vicariously feel the influence of the college, and are thus led to feel that what concerns the welfare of the college is of direct concern to them. The attitude of the mass of the people today towards the college is one of curiosity displaying itself from afar rather than of immediate interest. Indeed, it sometimes would seem that only athletic exhibitions form a direct line of

connection between the college and the average community life. In the third place it tends to erect dams which prevent the stream of teachers flowing from the college walls from seeking or finding congenial service in the grades, and thereby tends automatically to perpetuate whatever narrowness of horizon or paucity of resource is characteristic of the elementary school. Fourth, it operates to isolate the college in its working relations to life, and thereby to hinder it from rendering its normal service to society.

I pass on now to the second main line of problems—that having to do with preparation for college on one side, and for life on the other. Ultimately this is not a different problem, but simply another outgrowth of the same question. A few years ago a happy formula was current: the proposition that the best preparation for college was also the best preparation for life. The formula was such a happy one that if formulæ ever really disposed of any practical difficulty, there would be no longer any problem to discuss. But I seem to observe that this proposition is not heard so frequently as formerly; and, indeed, that since it was uttered things seem to be taking their own course much as before.

The inefficiency of the formula lies in its ambiguity. It throws no light on the fundamental problem of Which is Which? Is it preparation for college which sets the standard for preparation for life, or is it preparation for life which affords the proper criterion of adequate preparation for college? Is the high-school course to be planned primarily with reference to meeting the needs of those who go to college, on the assumption that this will also serve best the needs of those who go into other callings in life? Or, shall the high school devote its energies to preparing all its members for life in more comprehensive sense, and permit the college to select its entrance requirements on the basis of work thus done?

I shall not attempt to solve this problem, and for a very good reason. I believe that there are forces inherent in the situation itself which are working out an inevitable solution. Every step in the more rational development of both high school and college, without any reference to their relationships to each other bring the two more closely together. I am optimistic enough to believe that we are much nearer a solution of this vexed question than we generally dare believe. Quite independent of any question of entrance requirements, or of high-school preparation, the college is undergoing a very marked development, and even transformation, on its own account. I refer to

such developments within the college course as the introduction not only of the Ph. B. and B. S. courses side by side with the older classical courses, but also to the forward movement in the direction of a specific group of commercial and social studies; and to the tendency of all universities of broad scope to maintain technological schools. I refer also to the tendency to adapt the college work more and more to preparation for specific vocations in life. Practically all the larger colleges of the country now have a definite arrangement by which at least one year of the undergraduate course counts equally in the professional course of law, medicine, or divinity as the case may be. Now, when these two movements have reached their fruition, and the high school has worked out on its own account the broadening of its own curriculum, I believe we shall find that the high school and the college have arrived at a common point. The college course will be so broad and varied that it will be entirely feasible to take any judicious group of studies from any well organized and well managed high school, and accept them as preparation for college. It has been the narrowness of the traditional college curriculum on one side, and the inadequacy of the content of high-school work on the other, which have caused a large part of our mutual embarrassments.

I must run rapidly over the problems referred to under my third and fourth main heads—those having to do with adjustment to individual needs, and to the social uses of the school. I take it that these illustrate just the same general principle we have been already discussing. The school has a tradition not only regarding its position in the educational system as a whole, and not only as regards its proper curriculum, but also as regards the methods and ideals of discipline and administration in relation to its students.

There can be no doubt that many of these traditions are out of alignment with the general trend of events outside the school walls—that in some cases the discrepancy is so great that the high-school tradition cuts abruptly across this outside stream. One of these influences is found in the tendency equally marked in the family, church, and state, to relax the bonds of purely external authority, to give more play to individual powers, to require of the individual more personal initiative, and to exact of him a more personal accountability. There may be difference of opinion as to the degree in which the school should yield to this tendency, or should strive to counteract it, or should endeavor to utilize and direct it. There can be no difference of opinion, however, as to the necessity of a more persistent and adequate

study of the individual as regards his history, environment, predominant tastes and capacities, and special needs—and please note that I say needs as well as tastes. I do not think there can be any difference of opinion as to the necessity of a more careful study of the effect of particular school studies upon the normal growth of the individual, and of the means by which they shall be made a more effective means of connection between the present powers of the individual and his future career. Just the limits of this principle, and its bearings upon such problems as the introduction of electives, I shall not take up. We have no time for a detailed discussion of these disputed points. As I have just indicated, however, I do not see how there can be dispute as to the fact that the individual has assumed such a position as to require more positive consideration and attention as an individual, and a correspondingly different mode of treatment. I cannot leave the topic, however, without stating that here also I believe the ultimate solution will be found, not along the line of mechanical devices as to election or non-election, but rather through the more continued and serious study of the individual in both his psychological make-up and his social relations.

I have reserved the group of problems bearing upon the formation of a curriculum until the last. From the practical side, however, we probably find here the problems which confront the average teacher most urgently and persistently. This, I take it, is because all the other influences impinge at this point. The problem of just what time is to be given respectively to mathematics, and classics, and modern languages, and history, and English, and the sciences—physical, biological—is one the high-school teacher has always with him. To adjust the respective claims of the different studies and get a result which is at once harmonious and workable, is a task which almost defies human capacity. The problem, however, is not a separate problem. It is so pressing just because it is at this point that all the other forces meet. The adjustment of studies, and courses of study, is the ground upon which the practical solution and working adjustment of all other problems must be sought and found. It is as an effect of other deep-lying and far-reaching historic and social causes that the conflict of studies is to be treated.

There is one matter constantly accompanying any practical problem which at first sight is extremely discouraging. Before we get our older problems worked out to any degree of satisfaction, new and greater problems are upon us, threatening to overwhelm us. Such is the

present educational situation. It would seem as if the question of adjusting the conflicts already referred to, which have so taxed the time and energy of high-school teachers for the past generation, were quite enough. But no; before we have arrived at anything approaching consensus of opinion, the larger city schools at least find the conflict raging in a new spot—still other studies and lines of study are demanding recognition. We have the uprearing of the commercial high school; of the manual-training high school.

At first the difficulty of the problem was avoided or evaded, because distinct and separate high schools were erected to meet these purposes. The current now seems to be in the other direction. A generation ago it was practically necessary to isolate the manual-training course of study in order that it might receive due attention, and be worked out under fairly favorable influences. Fifteen years ago the same was essentially true of the commercial courses. Now, however, there are many signs of the times indicating that the situation is ripe for interaction—the problem is now the introduction of manual-training and commercial courses as integral and organic parts of a city high school. Demands are also made for the introduction of more work in the line of fine art, drawing, music, and the application of design to industry; and for the introduction of a larger number of specifically sociological studies—this independent of those studies which naturally form a part of the so-called commercial course.

At first sight, as just intimated, the introduction of these new difficulties before we are half way through our old ones, is exceedingly distressing. But more than once the longest way around has proved the shortest way home. When new problems emerge, it must mean, after all, that certain essential conditions of the old problem had been ignored, and consequently that any solution reached simply in terms of the recognized factors would have been partial and temporary. I am inclined to think that in the present case the introduction of these new problems will ultimately prove enlightening rather than confusing. They serve to generalize the older problems, and to make their factors stand out in clearer relief.

In the future it is going to be less and less a matter of worrying over the respective merits of the ancient and modern languages; or of the inherent values of scientific *vs.* humanistic study, and more a question of discovering and observing certain broader lines of cleavage, which affect equally the disposition and power of the individual, and the social callings for which education ought to prepare the individual.

It will be, in my judgment, less and less a question of piecing together certain studies in a more or less mechanical way in order to make out a so-called course of study running through a certain number of years; and more and more a question of grouping studies together according to their natural mutual affinities and reinforcements for the securing of certain well-marked ends.

For this reason I welcome the introduction into the arena of discussion, of the question of providing courses in commerce and sociology, in the fine and applied arts, and in technological training. I think henceforth certain fundamental issues will stand out more clearly and have to be met upon a wider basis and dealt with on a wider scale. As I see the matter, this change will require the concentration of attention upon these two points: first, what groups of studies will most serviceably recognize the typical divisions of labor, the typical callings in society, callings which are absolutely indispensable to the spiritual as well as to the material ends of society; and, secondly, not to do detriment to the real culture of the individual, or, if this seems too negative a statement, to secure for him the full use and control of his own powers. From this point of view, I think that certain of the problems just referred to, as, for instance, the conflict of language and science, will be put in a new perspective, will be capable of approach from a different angle; and that because of this new approach many of the knotty problems which have embarrassed us in the past will disappear.

Permit me to repeat in a somewhat more explicit way the benefits which I expect to flow from the expansion of the regular high school in making room for commercial, manual, and æsthetic studies. In the first place, it will provide for the recognition and the representation of all the typical occupations that are found in society. Thus it will make the working relationship between the secondary school and life a free and all around one. It will complete the circuit—it will round out the present series of segmental arcs into a whole. Now this fact will put all the school studies in a new light. They can be looked at in the place they normally occupy in the whole circle of human activities. As long as social values and aims are only partially represented in the school, it is not possible to employ the standard of social value in a complete way. A continual angle of refraction and distortion is introduced in viewing existing studies, through the fact that they are looked at from an artificial standpoint. Even those studies which are popularly regarded as preparing distinctively for life rather than for

college cannot get their full meaning, cannot be judged correctly, until the life for which they are said to be a preparation receives a fuller and more balanced representation in the school. While, on the other hand, the more scholastic studies, if I may use the expression, cannot relate themselves properly so long as the branches which give them their ultimate *raison d'être* and sphere of application in the whole of life are non-existent in the curriculum.

For a certain type of mind algebra and geometry are their own justification. They appeal to such students for the intellectual satisfaction they supply, and as preparation for the play of the intellect in further studies. But to another type of mind these studies are relatively dead and meaningless until surrounded with a context of obvious bearings—such as furnished in manual-training studies. The latter, however, are rendered unduly utilitarian and narrow when isolated. Just as in life the technological pursuits reach out and affect society on all sides: so in the school corresponding studies need to be imbedded in a broad and deep matrix.

In the second place, as previously suggested, the explanation of the high school simplifies instead of complicates the college preparatory problem. This is because the college is going through an analogous evolution in the introduction of similar lines of work. It is expanding in technological and commercial directions. To be sure, the branch of fine and applied arts is still practically omitted; it is left to the tender mercies of over-specialized and more or less mercenary institutions—schools where these things are taught more or less as trades, and for the sake of making money. But the same influences which have already rescued medical and commercial education from similar conditions, and have brought to bear upon them the wider outlook and more expert method of the university, will in time make themselves also felt as regards the teaching of art.

Thirdly, the wider high school relieves many of the difficulties in the adequate treatment of the individual as an individual. It brings the individual into a wider sphere of contacts, and thus makes it possible to test him and his capacity more thoroughly. It makes it possible to get at and remedy his weak points by balancing more evenly the influences that play upon him. In my judgment many of the problems now dealt with under the general head of election *vs.* prescription can be got at more correctly and handled more efficiently from the standpoint of the elastic *vs.* the rigid curriculum—and elasticity can be had only where there is breadth. The need is not so much an



appeal to the untried and more or less capricious choice of the individual as for a region of opportunities large enough and balanced enough to meet the individual on his every side, and provide for him that which is necessary to arouse and direct.

Finally, the objection usually urged to the broader high school is, when rightly considered, the strongest argument for its existence. I mean the objection that the introduction of manual training and commercial studies is a cowardly surrender on the part of liberal culture of the training of the man as a man, to utilitarian demands for specialized adaptation to narrow callings. There is nothing in any one study or any one calling which makes it in and of itself low or meanly practical. It is all a question of its isolation or of its setting. It is not the mere syntactical structure or etymological content of the Latin language which has made it for centuries such an unrivaled educational instrument. There are dialects of semi-barbarous tribes which in intricacy of sentential structure and delicacy of relationship, are quite equal to Latin in this respect. It is the context of the Latin language, the wealth of association and suggestion belonging to it from its position in the history of human civilization that freight it with such meaning.

Now the callings that are represented by manual training and commercial studies are absolutely indispensable to human life. They afford the most permanent and persistent occupations of the great majority of human kind. They present man with his most perplexing problems; they stimulate him to the most strenuous putting forth of effort. To indict a whole nation were a grateful task compared with labeling such occupations as low or narrow—lacking in all that makes for training and culture. The professed and professional representative of "culture" may well hesitate to cast the first stone. It may be that it is nothing in these pursuits themselves which gives them utilitarian and materialistic quality, but rather the exclusive selfishness with which he has endeavored to hold on to and monopolize the fruits of the spirit.

And so with the corresponding studies in the high school. Isolated, they may be chargeable with the defects of which they are accused. But they are convicted in this respect only because they have first been condemned to isolation. As representatives of serious and permanent interest of humanity, they possess an intrinsic dignity which is the business of the educator to take an account of. To ignore them, to deny them a rightful position in the educational circle, is to maintain



within society that very cleft between so-called material and spiritual interests which it is the business of education to strive to overcome. These studies root themselves in science; they have their trunk in human history, and they flower in the worthiest and fairest forms of human service.

It is for these various reasons that I believe the introduction of the new problem of adjustment of studies will help instead of hinder the settlement of the older controversies. We have been trying for a long time to fix a curriculum upon a basis of certain vague and general educational ideals; information, utility, discipline, culture. I believe that much of our ill success has been due to the lack of any well-defined and controllable meaning attaching to these terms. The discussion remains necessarily in the region of mere opinion when the measuring rods are subject to change with the standpoint and wishes of the individual. Take any body of persons, however intelligent and however conscientious, and ask them to value and arrange studies from the standpoint of culture, discipline, and utility, and they will of necessity arrive at very different results, depending upon their own temperament and more or less accidental experience—and this none the less because of their intelligence and conscientiousness.

With the rounding out of the high school to meet all the needs of life, the standard changes. It ceases to be these vague abstractions. We get, relatively speaking, a scientific problem—that is a problem with definite data and definite methods of attack. We are no longer concerned with abstract appraisal of studies by the measuring rod of culture or discipline. Our problem is rather to study the typical necessities of social life, and the actual nature of the individual in his specific needs and capacities. Our task is on one hand to select and adjust the studies with reference to the nature of the individual thus discovered; and on the other hand to order and group them so that they shall most definitely and systematically represent the chief lines of social endeavor and social achievement.

Difficult as these problems may be in practice, they are yet inherently capable of solution. It is a definite problem, a scientific problem, to discover what the nature of the individual is and what his best growth calls for. It is a definite problem, a scientific problem, to discover the typical vocations of society, and to find out what groupings of studies will be the most likely instruments to subserve these vocations. To dissipate the clouds of opinion, to restrict the influence of abstract and conceited argument; to stimulate the spirit of inquiry

into actual fact, to further the control of the conduct of the school by the truths thus scientifically discovered—these are the benefits which we may anticipate with the advent of this problem of the wider high school.

At the conclusion of Professor Dewey's paper, the topic was discussed as follows:

1. From the standpoint of preparation for college, by Wayland J. Chase, of the Morgan Park Academy.
2. From the standpoint of administration, by George H. Rockwood, of the Austin High School.
3. From the social and moral standpoint, by William I. Crane, of the Steele High School, Dayton, Ohio.
4. From the standpoint of the Manual Training School, by Charles A. Bennett, of the Bradley Polytechnic Institute.
5. From the standpoint of the college, by Professor Nathaniel Butler.

The papers upon these topics are herewith presented in their order.

#### 1. CURRENT PROBLEMS FROM THE STANDPOINT OF PREPARATION FOR COLLEGE

What constitutes preparation for college? Given time, any one of us can prepare a boy or girl to meet college-entrance requirements so far as subject-matter of these requirements is concerned. It is not ordinarily an easy task and it requires skill for its accomplishment. When it has been done, congratulating ourselves upon the completion of our work and complacently turning over the pupil to the college, we hold it thereafter responsible for the future welfare of the boy or girl. College is for the entering student the epitome of the world, a compact representation of life, and fitting for college therefore is fitting for life. Preparation for college should be as manifold as the demands that life at college makes upon mind, body, and character. Therefore, preparing a boy for college means, along with the furnishing him with an adequate stock of fundamental information, the training of the power to think straight and to do work well in certain prescribed lines, the securing for him as much physical vigor as heredity and other uncontrollable circumstances will permit, together with that knowledge of his physical self which is too commonly left for him to gather where and how he will, and to train in him the power of self-direction, self-control, and sense of personal responsibility. These are what the training of the secondary school should

seek to give, so that real fitness should be the product of our effort. How to do it, certainly constitutes a real current problem.

The shrewd Martin Dooley declares that "you can lead a boy to college, but you can't make him think," and in this witticism we can hear the public's declaration that we are not yet educating the boy adequately. The work of the college preparatory school has not been done till the boy has been taught to think independently and has acquired some degree of initiative in mental activity. To clear thinking with young people legible, neat and orderly presentation of written work conduces more than we are wont to recognize always in our class rooms; and as one step in the solution of, the problem I would urge a greater insistence on those elements of form so highly prized in the business world, so frequently little heeded in the secondary school. College teachers not uncommonly scorn consideration of these elemental accomplishments, thinking that to the preparatory school attention to such things must be relegated and we of the secondary school commonly proceed as if we thought that the place to teach penmanship, and proper care in presentation of written work was in the grades and there only. The common charge against the college that the student is permitted, if not compelled by existing conditions of note-taking, to ruin his penmanship, may be transferred to the secondary school to the extent of this, that we at least accentuate rather than eliminate whatever weaknesses of these sorts the grammar pupil brings to us.

The relation that neatness and clearness bear to presentation of thought, thoroughness bears to thought processes and, aware as we all are of the essential value of this quality, we are yet prone to shrink from the drudgery that cultivation of it in our pupils imposes on us. No characteristic of college preparatory work stands higher than this in educational value. It is the parent of intellectual honesty, the defense against shallowness and incapacity and the sole and only proper foundation of scholarliness. In the pupil it is the product of the teacher's insistence in season and out of season on his understanding fully and learning exactly each fundamental portion. It means for the teacher the iteration and the reiteration of principles, the correcting and recorrecting of written work and calls for patience and thorough devotion to the teacher's calling. For the cultivation of clearness in thinking, for the testing of thoroughness of knowledge, as well as for training in accurate expression no class-room exercise has such value as the putting of the thought into writing. It is this that

makes the laboratory notebook an invaluable adjunct of science work, that gives to prose composition its great value in language work and that should make written work an important part of the drill of every class room. The experience of us all urges that this written work in order to foster origination and not imitation, the foe to thoroughness, should be done as frequently as possible in the class room and not outside.

It is but a short time ago that the development of the body of the student was no part of the school's or the teacher's responsibility. To the college first the gymnasium seemed essential, and now the secondary schools are concerning themselves increasingly with the physical part of education. And the impulse to this recognition is from without as well as from within the teacher's profession, from the parents as well as from the children. Unquestionably the wide-spread popularity of the military school among parents is based in part upon the belief that these schools can do much for the physical welfare of their sons; and the public, which proclaims ever and anon against educational fads, when now it builds new high-school buildings, includes in the completeness of their equipment, as in the new Joliet Township High School, the outdoor gymnasium for the boys and the indoor gymnasium for the girls. For the greater furtherance of this physical welfare it is needful that boys and girls should be taught matters pertaining to their physical selves that now they learn often too well, but not wisely, from just those sources from which they should not have to learn them. On the fearsome ignorance of our boys of secondary-school age there are thriving in this city alone scores of charlatans whose advertisements appear everywhere, and whose fearful declarations work untold misery. Plain straight talks, preferably not as sermons and preferably from physicians, would set right hundreds of boys in every school community and make mightily for physical welfare if only in the direction of relieving unwarranted worry. To meet the objection that thus much might be revealed that it is best for boys and girls not to know if they can be kept from knowing, I would urge that exceedingly few arrive at the age of those who enter college without knowing them already in half and perniciously ignorant fashion. I would further urge that for most of the objections that suggest themselves remedies are not far to seek.

To prepare for the transition from school to college so that the passage from the restraints and loving protection of home or from the discipline of the boarding school to the larger freedom of college,

"from the sense of study as an obligation to the sense of study as an opportunity," shall not be attended with shipwreck is the third element of this problem of fitting for college. We all have seen that college instead of being the boy's supreme opportunity, as Dean Briggs has styled it, has been for some a period either of downright dissipation or of purposeless, listless drifting. We cannot honestly put all the responsibility for these failures on the college, for the college can properly look to us to send to it pupils already awakened to opportunity, already trained to stand alone and able to choose with a modicum of guidance between good and evil. The average eighteen years old boy just out of our schools is possessed of an overweening sense of his own importance and of his complete adequacy for all the experiences of life and therefore is in prime condition to be tripped by temptation. Moreover, because of but recently developed physical powers he is peculiarly exposed to temptation.

For this impending struggle with the world, the flesh and the devil it is the best school which best prepares him and which sends him out equipped with self-control and well-developed sense of responsibility to himself. Of course it is recognized that in study itself continued and wisely directed through four years there is moral as well as mental discipline, and that there is a mighty, saving grace in hard work. But how further to develop self-control and individual student responsibility is the question, and I suggest that they can be trained to a still further degree by gradually reducing the extraneous obligations of the pupil's school life as he nears the end of his course, substituting for some of the school's regular requirements the opportunity for self-direction. For instance, in one boys' school the seniors have a separate dormitory where rules respecting study-hours do not obtain, the members being self-regulating with reference to that and some of the less significant school requirements. And it would seem that application of this plan might find trial in day school in the direction of reducing teacher supervision of study-rooms and doubtless in other ways.

No features of school life are so helpful in this direction as the students' own interests, controlled and managed by themselves. Through the need which in them they see and feel of rules and regulations they get respect for law and organization and learn to identify the teachers' interests with their own. Admirably working to this same end are even the small concessions in school government which it has been found safe to make to the student body from time to time and which vary from monitor systems and student councils to more

ambitious attempts at self-government. In the aspirations of athletic students to win place and fame at college in the struggles of the campus we have a wholesome influence, making for abstinence and continence where other restraining considerations are lacking.

Too little do the advocates of free electives in the secondary school appreciate that in doing the distasteful task there is a disciplinary outcome whose value in character-making and in preparation for the struggles of later life is very great. To him that overcometh is the promise of power as truly in the secondary school as elsewhere and the failure of the overfond parent and the indulgent teacher to realize this is responsible for much of the weakness which we deplore in the college student. School is life as well as preparation for later life and the identification of these two elements in our thought of school problems is indispensable.

## 2. FROM THE STANDPOINT OF ADMINISTRATION

Mr. Rockwood said in part:

I propose to speak very briefly upon three of the points suggested in Professor Dewey's exhaustive syllabus.

The problems which I shall present are not new or startling; they are simply to my mind, unsolved, and for that reason are set forward.

1. The adjustment of the secondary school to the grades. (I, 1, c of the syllabus.)

I quite agree with Professor Dewey that the next great movement in secondary education is to adjust itself to the work below. Let me speak of three factors that seem to enter into this problem.

(a) The gulf between elementary and secondary schools: Two breaks in our educational system have been much commented upon — the break between secondary school and college and the break between elementary and secondary school. Much has been done to bridge the former. Secondary schools and colleges no longer stand apart and throw stones at each other. By conferences such as this they have come to understand, each the other's aims and limitations, and to be mutually helpful. The gap between elementary and secondary school has never been so apparent, but, nevertheless, has been, and is real. The methods of administration and instruction in the high school and the grammar school differ widely. Very many young people find it difficult, impossible indeed, to adjust themselves to the change, and hence the large falling off in numbers during the first year. How shall this gap be bridged and so more of our young people be saved to

the larger outlook upon life that the secondary school gives? The building that houses the Austin High School houses also the seventh and eighth grades from four schools in the immediate vicinity. These grades are under the same supervision, and subject to the same methods of administration as the high school. The teachers work in departments and the instruction has the same vigorous tone as in the high school. Somewhat similar conditions prevail in three other high schools in Chicago. Nothing so knits together eighth and ninth grades as this close daily contact—good alike for grammar and high school.

(b) Mid-year classes: Promotions twice a year, class promotions at any time, individual promotions—these are plans familiar enough in the administration of elementary school affairs. High schools in many cities are admitting and graduating students twice a year. The plan was tried in Chicago twenty-five years ago and abandoned. It is on trial again. Difficulties of classification beset the plan. Not all elementary schools seem to be in sympathy. Doubtless it means smaller classes in the high school, more perplexities in the program, and a slightly increased expense *per capita*, but from a pedagogical standpoint where the highest good of the pupil is the only concern, mid-year classes are a wise provision.

(c) Departmental work: Are there any wise limitation upon departmental work especially in the first year of the secondary school? Shall the youth, fresh from the elementary school, meet as many different teachers as he takes subjects—a half dozen perhaps—or shall the same teacher give instruction in two or more related subjects—English and Latin and history, or mathematics and science? Most teachers wish but one subject that they may specialize. Specialists are not needed in the early years of the secondary school; sympathetic teachers are. I would limit, then, the departmental work in the secondary school. On the other hand, in the grammar school, I would increase the departmental work. The seventh and eighth grades call for scholarly effort on the part of the teacher. No one can do his best who must prepare the whole program. Introduce departmental work and at the same time ease the burden of the teacher and accustom the pupil to the methods of the high school.

2. The adjustment of the work to the individual. (III of the syllabus.)

(a) The responsibility of the elective course: There is no longer a rigid course of study anywhere. By parallel courses—classical, general, English, commercial—by partial electives, or by free electives,



choice in his work is presented to the secondary-school student. Responsibility for this choice rests somewhere. Shift it as we may upon the pupil himself, or his home, it still returns to the administration of the school and it becomes no small burden to advise this or that, when it is remembered how potent in all his future is the use of the student's time during the formative years of secondary-school life.

(b) What shall be done for the "pint cup" people? The curriculum of the secondary school is broad and comprehensive. To carry it with even a moderate degree of success takes first of all mentality and then patient application. A large number of young people come up through the grades with only indifferent success. Their motives are high; they are earnest and purposeful, but they have only small capacity and cannot shine in our classes. What shall be our policy? We must insist upon high standards of scholarship, and yet we wish to serve the largest number possible. The elective course of study helps wonderfully. Something may be found that will appeal strongly to a mind slow to move in the grooves where others move easily; more time may be taken to complete a given subject, and so the intellectual horizon of a small mind be greatly widened.

3. Liberty *vs.* license in school government. (IV, 2, of the syllabus.)

Young people in our secondary schools are at just the age when the idea of personal liberty is being strongly developed. We live in a time when this idea is prominent, not to say rampant. Elementary-school children for the most part yield readily enough to the somewhat military methods of discipline necessary in dealing with large numbers, if this discipline be firm and just. But methods must be modified in the high school, and personal responsibility be developed. In the last years various schemes of self-government have been devised, some of them eminently successful. But how to allow necessary and wise liberty in the administration of a school and not let that liberty become license is a great, and I think for most of us an unsolved, question.

It was recently said of one of the most conspicuous schoolmasters in Massachusetts that he is a "character builder." No higher compliment could be paid to the head of any school. Now, it is in the discipline and government of a school that opportunities for character building most present themselves. But character grows only when self-control is exercised. Give, then, to the youth of our secondary



schools the high privilege of developing character by such plans of organization that they shall be free from petty restrictions and inspired to do right for its own reward.

### 3. FROM THE SOCIAL AND MORAL STANDPOINT

I think it is best first to define my subject, so that I may know what I am talking about. "Current Problems in Secondary Education from the Social and Moral Point of View."

I will reverse the order of the two important words in my subject, social and moral, as it seems to me that the second, as stated in the subject, is a manifestation of the first. The social problem is that which deals with the manifestation of a moral nature in one's acts or deeds toward his fellow-man. The social nature is dynamic. It is morality put to practice.

All clubs, school organizations, and societies at last boil themselves down in their purpose to this fundamental of character building. If societies and clubs are "successfully" carried on, it does not necessarily follow that character is built; but, if character is successfully built, societies and clubs will be successfully carried on. So I prefer to discuss the fundamental, character building, about which so much has been said and written.

In spite of all that has been said and done concerning character building or development of moral character, it must be confessed that we have failed to attain the thing desired—such development of moral nature as should be evinced in true social life. It must be said that very little of our work has ended in achievement. And it becomes necessary, so it seems to me, before we try any more devices, to diagnose the case and look for the *cause* of our failures.

The real cause of our failure lies in the lamentable fact that the world in our time seems to have a vicious hankering after the new and startling. A new device, a new scheme, will cause the schools to drop their work and run after it like a child after a new toy, and thus they become only more bewildered and make the matter more complex. Under all complexity there exists an absolute simplicity. It is the reduction of all our devices, schemes, plans, clubs, and societies which constitute the complexity behind which lies the simplicity, that we want to find. We have begun at the wrong end of the problem. We have begun from without when we should have begun from within, and the ways in which we have plucked after leaves, instead of digging at the root, are many and various. I will classify and briefly describe them.

The first that I can remember was that style of moral teaching in which a student was supposed to become moral when he had committed to memory, generally without understanding, a lot of noble precepts like "there is no excellence without great labor." The children were taught to recite on certain days little poems in which they repeated good things children should be, and then offered themselves as a beautiful example, as in the following:

## WHAT I LOVE

I love to see a little girl  
Rise with the lark so bright;  
Bathe, comb, and dress with cheerful face,  
Then thank the God of light.  
  
And, when she comes to meet mamma,  
So fresh, and neat, and clean,  
And asks a kiss from dear papa,  
With such a modest mien,  
  
That all who see her gentle look,  
And pretty actions too,  
Will feel that she's a darling child —  
Kind, honest, loving, true.  
  
These are the things I so much like;  
And now, who'll try to be  
The meek and modest little girl  
Which you before you see?

This moral training was so absolutely contrary to human nature that it only resulted in the development of a lot of cheerful little liars.

And then came the old-style college moral training in which a pious, old, white-haired doctor of divinity taught the boys moral philosophy *intellectually*, thinking that when the boys were able to pass a good examination upon what the books said about morals, they would certainly be moral men. Such training never got within telescopic view of the suburbs of real morality. The old professor's work would be amusing if it were not pathetic.

And then came the more modern cry of certain religionists "for the teaching of morals in the public schools," which they want done by reading the Scriptures on every possible occasion, and so the children repeat the Lord's Prayer, mouthing the sacred words "Thy kingdom come," without the slightest conception of what the expression

means; and such moral training also comes to naught, except in helping the child toward his failure to realize that he is not moral, and to be satisfied that he has done his moral duty when he has read some Scripture and said his prayers.

And then came that remarkable device known as the "pupil government scheme," wherein, to get rid of the pupil's fear of the teacher, the promoter substitutes the fear of his fellow-pupil. The purpose of the pupil government scheme seems to me to be the production of order, in order to relieve the teacher rather than to develop the child. If order is morality, then we should imitate the lock-step of the penitentiary. The pupil government scheme is one of the many fathers of fear, and therefore a grandfather of many vices. This thing will fall like all other schemes and devices in which the moving power is fear or restraint. I believe in pupil government, but on a purely individual basis. The scheme which implies officers of justice will surely fail.

These things will not do. The true idea, the fundamental idea of moral training is very old and very simple. It was taught by Confucius, by Buddha, by Christ, and by Paul. In our application of this method to the development of morality in the public schools, we have failed signally. The pupils have no moral selfhood; their morality all the time depends upon others; it is not self-centered. They have to be watched, and in a majority of cases a teacher dare not leave his class room for fear a pandemonium council will take the place of his so-called "order."

The trouble is that we have not gone at the thing philosophically. In the correct doing of anything on the face of the earth, there are four steps which are absolutely essential:

1. The formation of a definite and correct purpose.
2. The determination of the steps necessary for the attainment of the purpose.
3. The means necessary for the taking of the steps for the attainment of the purpose.
4. The application of the means in order that the steps may be taken so that the purpose may be attained.

And we have been in such a hurry to teach morality by the get-rich-quick plan that we have been unwilling to study our purpose, our steps, and our means before we began the application of the means. We have applied unknown means in order to take undetermined steps in order to attain a vague, shadowy, and indefinite purpose.

This will be promptly denied. We say we have a purpose, and that this purpose is character building, or the development of the highest morality. Yes, we have said this, but we have not stopped to consider what is character or morality. We have made out no specifications of our task.

What is character? Character is the sum of the characteristics which would fit a man to live completely. What are these characteristics which should be our specific aims? Christ gives us some of them in the Sermon on the Mount, when he says we should be merciful, we should be peacemakers, we should be meek, we should hunger and thirst after righteousness or the quality of being and doing right. We all know that before we can ever correct the present state of things, which cry aloud for correction, we must change the *hearts* of men; that when we have implanted in men the king-becoming graces that Christ, Paul, Shakespeare have laid down for us, the public abuses of today and the private wrongs of today will be corrected incidentally. They cannot be corrected permanently from outside the hearts of men. Therefore, our problem is to lay aside all devices and get at the heart of things by a studied and determined attempt in the public schools to develop in the hearts of the children the king-becoming graces. We must work from within, and not from without.

The task is not half so difficult as it seems. It is in no wise hopeless, for it can be clearly shown that all men, good and bad, love and admire the king-becoming graces, whenever any man exhibits them. A criminal will go into ecstasies about every noble hero in a cheap novel; and he will hate the villain worse than you and I; and a crowd of people of the lowest stage of morality will stand up for hours in a cheap theater in an ecstasy of enthusiasm over the generous hero of the play, and they will hate the villain of the play more fiercely than you and I. The trouble exists in the fact that in all the methods of the past—the precept method, the Scripture method, the “moral philosophy intellectually method,” etc.—we have failed in inducing men to transform their ideals over into deeds. There is nothing in all this world that is of value to man except as it refers back to human life. Our past teaching has not done this. This is illustrated by a case that occurred to me personally a few months ago. One Sunday morning I was passing by a church to which there was attached a pretty lawn, the property of the church. As my walk led me in front of the church, I heard the congregation piously intoning the Lord’s Prayer; and at the moment of my passing they came to the beautiful words, “Forgive

us our trespasses as we forgive them that trespass against us." The last words brought me to the corner of the church and in sight of the lawn, on which I was astounded to see a large tin sign bearing the inscription: "Trespassers on this lawn will be prosecuted." So little did the people who were repeating the Lord's Prayer realize what they were saying that they were actually praying for the Lord to prosecute them. And this is a sample of the way in which our adoration of the Deity has led us to forget the transformation of sacred precepts into living deeds among our fellow-men. This awful error impels me to pray with Abou Ben Adhem, "I pray thee then write me as one that loves his fellow-man."

All children love the heroes who have been good and noble. Only, they seem never to have realized that these heroes were good and noble simply because they possessed the king-becoming graces; and secondly, that those king-becoming graces are still attainable. They practice prospection, retrospection, dextrospection, sinistrospection, neighborspection, and all sorts of spection except introspection, and so my first aim is to get my pupils to realize that what makes men admirable and grow is that they possess the king-becoming graces; secondly, to get them to take these king-becoming graces—go home and sit down before a paper containing the list, and then look within to determine whether their daily deeds show that they possess the king-becoming graces. They soon come to realize their shortcomings, and with it comes an earnest wish to be, and this is the beginning of morality.

And then he must be made to realize that law which teaches us that there is no way to attain the king-becoming graces but by going through processes *in them*. No one can learn to love his fellow-man without loving his fellow-man. No one can acquire self-control without self-controlling. No one can become habitually merciful without daily practicing mercy. And all devices and all "get-rich-quick" schemes must fail. I might say, to paraphrase Paul, that whether there be precepts, they shall fail; whether there be pupil government schemes, they shall cease; whether there be Scripture readings, they shall vanish away, and that the only way to get children to become moral is by inducing them, not forcing them, to strive *to be moral*.

How shall we do this? I tried to show in the June number, 1901, of the SCHOOL REVIEW, the details of how this thing is to be done. Limitation of time forbids me to repeat it. But the only means to create in the heart of a child a wish to attain the king-becoming

graces that make man moral and thus lead him to a true and noble social life, is persuasion, of which Socrates said :

But I think that young men who exercise their understanding, and expect to become capable of teaching their fellow-citizens what is for their interests, grow by no means addicted to violence, knowing that on violence attend enmity and danger, but that by persuasion the same results are attained without peril, and with good will ; for those who are compelled by us, hate us as if despoiled of something, while those who are persuaded by us, love us as if they had received a favor. It is not the part, therefore, of those who cultivate the intellect to use violence ; for to adopt such a course belongs to those who possess brute force without intellect. Besides, he who would venture to use force has need of no small number of allies ; but he who can succeed with persuasion has need of none, for, though left alone, he will think himself still able to persuade.

And in closing this brief paper, I hope it will be understood that, if I have failed to deny a thing, I do not, in any wise affirm it nor imply it ; and *vice versa*, if I have failed to affirm certain things, I hope it will be understood that I have in no wise denied them.

#### 4. FROM THE STANDPOINT OF MANUAL TRAINING

The questions which I have been asked to discuss this morning seem to cluster around, or grow out of the familiar proposition, that the chief function of the secondary school is to help pupils to discover themselves. It is not, we say, of greatest importance that the high-school graduate on commencement day shall know the contents of a certain number of books or have power to do a certain number of specific things, but that he shall have discovered the pathway which leads to the field of activity which he is best endowed by nature to work in. He may not have observed the windings or the end of the pathway or the breadth of the field, but he should be reasonably certain as to the general direction in which it lies and have already turned his face that way.

If this is the chief or even one of the chief functions of secondary education, then it follows that the high school must afford a wide range of opportunity through a variety of studies and occupations. Indeed it must insist upon each pupil having a rich and varied course. Especially is this true for the first two years or more ; otherwise, how can a pupil be sure to discover himself ? How can he discover that he was meant to serve in any particular one of the great divisions of human activity until he has tried such activity or at least has obtained some knowledge of its rudimentary forms ?

To afford such opportunity as is here suggested, the school must have a course of study which is both broad and rich, covering not merely language and mathematics, but history, science, and industry as well. The course must not be dried up in one part and juicy in another, but juicy and tempting throughout.

One of the chief obstacles in the way of realizing the full measure of results from this great function of secondary education, is the establishment of specialized high schools in our larger cities. Such action affects not only the larger cities themselves, but the smaller ones also which try to copy after them. When there has been established in a given city a Latin high school and an English high school and a manual-training high school, the resulting grouping of studies for these several schools materially narrows the opportunities of the individual pupils in each one of them. Or, if there is no narrowing because there was never greater breadth, we observe that whereas formerly, or under other conditions, each individual was given all the opportunities the city afforded, now has only a fraction of them. Unless it can be proven that sufficient opportunity to discover aptitude is given during the several grades of the elementary schools and that the pupil is developed enough to make intelligent use of this opportunity—which would be very difficult to prove—then the plan of having specialized high schools works against the realization of the highest ideals in secondary-school work.

The question then arises, is it not possible to organize high schools which shall bring together the opportunities of all of the special schools in a single organic whole? When this question is answered in the affirmative and a satisfactory plan for such a school has been outlined, then we shall see more clearly the form and framework of a superior type of high school for small cities and towns which shall be the same in kind, though not in degree, as the school in the largest city.

So far as the development of separate Latin and English high schools is concerned, only a small section of country has been affected—the extreme East; but the manual-training high school, born in the West and quickly copied in the East and encouraged by private gifts, has affected secondary-school work in large cities throughout the entire country. The popularity of these schools has been so marked that there is not a shadow of doubt that they have met a demand which is just as real in the small city as in the large, and one which will be just as great in the next generation as in the present one. Though housed in inferior buildings, as in Philadelphia, Brooklyn, and Chi-



cago, they have been overcrowded with students, and are daily accomplishing what was once deemed impossible, namely, giving students the benefit of a large amount of work in manual training and drawing, and at the end of four years, sending them to college or to business with superior preparation. As would be expected, there have been some misfits in individual cases, and the wisest of the principals of these schools have constantly reduced the number of such by broadening the course of instruction until in some of these schools the student may study Latin, and in nearly all of them, German and French, under conditions about as favorable as in high schools of the older type. Under such conditions, the new school encroaches upon the territory of the old, and really becomes a general high school in which emphasis is placed upon manual training.

Now that the great value of manual training has come to be recognized in secondary schools, why should not all pupils have the benefit of it? Since the manual-training high school has so fully demonstrated its efficiency and, in its best form, has come to be a broad general school with emphasis on manual training, why should not another step forward be taken by removing that emphasis, or better, by emphasizing each of the particular lines of work to the same degree? Then, when considered from the point of view of our initial proposition, we should have a high school of a higher type than is common today. In certain manual-training high schools there seems to be a lack of proper balance of opportunity due to an over-emphasis upon some of the more technical branches of manual training. This technical work would not seem to be so excessive if it were balanced by equally specialized work in several other directions—in language, literature, applied science and art. The danger lies not so much in offering too much in any one line as in failing to keep a proper breadth and balance of opportunity and in neglecting to study the needs of the individual students. If under given conditions, the manual-training high school as it is usually constituted today presents too large a proportion of manual training to balance other subjects, prune it down, if you cannot increase the other subjects to the same proportion.

This suggests the thought that, once having in mind this typical high school in which are combined all that is best in the Latin, the English, and the manual-training high school, the way is open for adapting this school to cities and towns of various sizes. In doing this, we must deal with cross sections, as it were, instead of longitudinal sections of the courses in the typical school, reducing or enlarging to

suit the size and wealth of the community. Thus the very large town or small city would have a high school which includes in its course something in each of the fundamental lines of study represented in the typical school for the large city of which we have been speaking, but none of these lines would be represented in so rich and varied a manner. For instance, Latin might be taught, but not Greek; German, but not French; geometry, but not trigonometry; biology, but not physiography; freehand and mechanical drawing, but not architectural drawing and machine design; woodworking and metalworking, but not pattern making and machine construction; the arts of the household, but not technical millinery or tailoring. Manual training would be given as much of a representation as the sciences. Woodworking, metalworking, the domestic arts and drawing would balance chemistry, biology and domestic science.

To be more specific with reference to manual training and drawing, every township high school should have a room equipped for woodworking, one for drawing and another for household arts. Under some conditions, two rooms instead of three would be sufficient. The high school of a city from 30,000 to 100,000 inhabitants should have a room for woodworking equipped for bench work and wood-turning; another for working cold metals such as filing and fitting, bent-iron work, hand-tool turning and sheet-metal work, including metal-spinning; a third room, of smaller size, should be the connecting link between manual training and physics, and be supplied with a few machine tools, a forge, and tools and apparatus for electrical construction and testing. In connection with each of these rooms there should be a stock and tool room and a wash room. One large room should be provided for needle work, dressmaking and the study of textiles, and two for drawing—perhaps one for freehand and the other for mechanical. Domestic science should be classed with science studies, and as such, be provided with a laboratory. Such an equipment as this, though much smaller than that of the average manual-training high school, under the direction of a teacher who sought to bring together art and handicraft, science and construction, in fact unity in the entire school work, would yield remarkable results. A high school for a large wealthy city like Chicago or Cleveland or Boston should contain in addition to what has already been mentioned, rooms for forging, foundry work, machine tool work, also extra space for drawing and art work, including the household arts, and for household science—in short, about such an equipment as is now found in the

best manual-training high schools. Such a school would be of large size, and only a fraction of the students would take the maximum amount of work in manual training. It would, however, if properly balanced, be richer in opportunity than any public high school with which I am acquainted. On the other hand, such a high school need not involve the expenditure of any more money than is now being expended on high-school buildings in some of our largest cities.

Coming back again to one of the thoughts already touched upon, the best results from a high school of this type, whether in magnified or miniature form, can be obtained only when every pupil is required to do a certain minimum of work in each of the fundamental lines of effort before he is allowed to choose his course or group of studies. In other words, before he is allowed to choose definitely his group of studies, he must have taken work in English, one foreign language, mathematics, science, history, drawing and manual training. Very few options should be allowed during the first two years. After the pupil has spent a reasonable length of time on each of the fundamental lines of study, he is in a far better condition to make an intelligent choice than he possibly could have been, had any one of these been omitted. There may be exceptions due to peculiar conditions, but this is the general rule. The kind of a high school then which I would advocate as best fitted to meet the usual conditions in secondary-school work, is not a manual-training high school, or a Latin high school, or an English high school, but a broad general high school covering the fundamental lines of instruction usually given in all these various schools, and carrying each line as far as local conditions make it possible and desirable, but keeping a breadth and balance of opportunity which is not possible in a school with a meager course of study, or in a school that is highly specialized.

#### FROM THE STANDPOINT OF THE COLLEGE

Professor Butler spoke in part as follows :

Common opinion that secondary schools are merely to meet the demands of the college. Colleges charge their shortcomings to failures and defects in the secondary system. In an important sense, problems of the secondary school must be solved primarily in light of a sound psychology rather than in light of preparation for college or a preparation for life.

The primary aim of secondary education is not preparation for college. The aim of secondary education is suitable preparation for the

period of adolescence; it is liberal education for adolescence. The emphasis must be upon the individual not upon his means for making a living. It is the work of the secondary school, not to make a specialist, but to make a man who may become a specialist.

This period of adolescence demands studies that call gradually into play his developing faculties. They must increase in difficulty and they must begin to satisfy his desires to understand and see reasons and relations. The nature of secondary education is determined by the nature of *things*, not by nature of college requirements.

### III. THE DEPARTMENT CONFERENCES

In accordance with established customs the general conference resolved itself into departmental conferences for the afternoon sessions. The proceedings of these conferences are here given:

#### THE BIOLOGICAL DEPARTMENTAL CONFERENCE

was opened, Associate Professor C. B. Davenport in the chair, by a paper by Mr. H. N. Whitford on "Physiography and Botany."

There is an intimate relation between topography and distribution of plants. In order to show this any definite physiographic unit may be selected. Such a unit is found in a sand spit near the biological laboratory situated at the head of Cold Spring Harbor, Long Island. The spit stretches some 2,000 feet into the water, dividing the harbor into outer and inner parts connected by a narrow channel through which the tide runs.

The inner side of the spit shows definite plant societies. Between high and low tides a greater part of the area is occupied by the large salt reed grass (*Spartina polystachya*). Nearer the limits of high tide narrow zones of the glasswort (*Salicornia*) and sea-lavender (*Statice*) are found. Where the topography is more level and only slightly covered by water at high tide the rush salt grass (*Spartina juncea*) predominates. Again there are patches of no vegetation near the limits of high tide. A greater part of the spit that stands above high tide is covered with the sand-reed (*Ammophila arundinacea*). On the outer side of the spit just above the limits of high tide is a narrow zone in which scattering specimens of the saltwort (*Salsola kali*) and sea-rocket (*Cakile Americana*) are present. The region between high and low tide is barren of vegetation except near the low tide limit where *Ulva* grows attached to

pebbles. Beyond the low tide level on both sides of the spit the eel-grass (*Zostera marina*) is abundant.

These facts concerning the distribution of the plants are significant. They mean that in the different zones there are certain sets of physical factors which make possible the existence of plants which have adapted themselves to those conditions. The salt reed grass zone is situated where it is free from being submerged by salt water a very short time twice a day. The rest of the time it is partly or wholly submerged. This grass has adapted itself to these conditions, but no other forms have adapted themselves successfully; therefore they are not found here. A corresponding zone on the outside of the spit is free from vegetation. One would suppose that here, too, would be a zone of salt reed grass, but such is not the case for physical factors not present on the inside of the spit are found here. The storm waves and tidal currents are strong. Directly these would tend to uproot any plants that could start; indirectly they transport the finer particles of soil and leave only the heavier parts. Thus a pebbly beach unfavorable for seed germination is the result. So each zone has its own set of factors which determine the plant or plants that occupy it. It must not be understood that there are sharp lines between the plant societies; indeed, they grade imperceptibly into one another.

The physical factors that have made possible the spit as it is now are still working and thus gradually changing its topography. This means that the zones of plants will be adjusted to meet the new physical conditions. For instance, if the salt reed grass area be filled up so that the length of time it is out of and under water is different from that of the present, conditions are brought about that will no longer make it possible for the salt reed to grow. But these conditions may be exactly what is necessary for the rush salt grass society.

Vegetation also aids in changing the topography of the spit and the adjoining portions of the sea bottom. •

As stated, this is given as a type for study. It is believed that such a problem can be worked out by a high-school student in botany provided he has had the proper training in physiography. A great many facts concerning the structure and habits of plants can be brought out incidentally. Differences in topography can be found everywhere, and problems showing plant society development are abundant.

Dr. C. B. Davenport presented a paper upon "The Animal Ecology of the Cold Spring Beach."

On the outer, sandy beach one finds on the pebbly shore, numerous minute insects known as Thysanura or spring-tails. These are found at low tide nearly to the water's edge and spread upwards to six feet or so from the high tide line. The lower limit moves downward as the tide retreats, As it returns the spring-tails partly retreat and partly rise upon its surface, so that the water is covered with floating spring-tails. These are here to feed on the ground-up organic débris dropped by the tide.

At the high tide line a mass of wreckage is dropped at "slack water." This consists largely of decaying sea lettuce (*Ulva*) and drowned insects, especially beetles. This rich feeding ground, renewed twice a day, has attracted a distinctive fauna. The beach fleas and the rove beetles feed on the decaying vegetation; the ants that nest just above high tide carry away the stranded insects; running spiders prey on the young beach fleas.

On the *inner edge* of the sand spit, only a hundred feet away, the fauna is very different at the high tide line, just as the vegetation is. Here one finds the fiddler crabs; and just as the *Salicornia* is replaced by the *Statice* near the distal end of the spit, so is one species of the fiddler crab replaced by another. The conditions that determine the occurrence of the plant species determine that of the animal species also.

In the channel, through which the tide is nearly always rushing, there occur isolated bunches of the large salt-reed. These hold together the muddy substratum by their roots. But the mud would be washed away by the swift current were it not protected by a retaining wall of mussels. The mussels are themselves, in turn, afforded a favorable foothold where the food-bringing current runs swiftest.

A comparison of the marine beach on the sand-spit with the beach of Lake Michigan is instructive, for here, at a distance of eight hundred miles from the sea, we find the same assemblage of animals, excepting those that are exclusively marine. Similar Thysanura, carrion flies, rove beetles, robber flies, tiger beetles, ants, spiders, and sand colored grasshoppers. These occur also in definite zones. The lake beach at Chicago is worthy of especial study. A similar relation of animals to habitat will be found, although perhaps not so clear, on the dunes, in sandy spots, in clearings, and on the edge of lakes and streams. High-school students should certainly have their attention directed to these phenomena and seek an answer to some of the problems presented by animals in relation to habitat.

This was followed by a paper by Dr. H. C. Cowles on "A Comparison of Lake and Marine Beaches as to Ecology of the Vegetation." He said in substance:

At the present time there seems to be a tendency to relate different subjects more fully than we have done in the recent past, and thus escape the evils incident to narrow specialization. Perhaps it is not too much to hope that we may again have "naturalists." The Cold Spring Harbor spit shows the necessity of combining physiography, animal ecology, and plant ecology in order that one may fully understand either branch.

In comparing lake and ocean beaches the most striking result is found in the resemblances. Below the water-line there are differences, as one would expect, owing to the presence of salt water in the one case and fresh water in the other. Above the water line the flora is strikingly similar on lake and ocean. There is in each case a naked plantless beach just above the water line. In each case the pioneer plants are the same, viz., the sea rocket (*Cakile Americana*), the sea spurge (*Euphorbia polygonifolia*), the beach pea (*Lathyrus maritimus*). Farther back on the dunes, the most characteristic plant is the sea sand-reed (*Ammophila*); many other species are the same in the two cases, while very few species are different. Even on the Pacific coast several species are to be found which characterize our eastern beaches.

Whatever the ecological significance of the resemblances just noted their practical significance is clear, viz., that the facts of physiographic ecology are widespread rather than local. Hence it becomes possible for secondary schools to take up local problems with the assurance that they will have much more than local importance. The interpretation of nature, the attempt to find out why some plants or animals are in one situation and others in another is surely a fit topic to claim part of the attention of biology teachers and students in secondary schools.

In the discussion of these three papers the question was raised as to whether it would be practicable to apply these ideas in the secondary schools of Chicago or not. Dr. Davenport thought that a line of work might easily be developed on these lines which would be successful.

Dr. Cowles said that the important thing is to study nature from the standpoint of interpretation. The particular advantage of what we may call physiographic biology is that it is the phase of biology which the pupil will meet in after life. He will be



continually seeing rivers and lakes and hills ; and should understand their relation to animals and plants.

The objection was raised that the pupils will merely take the relations taught for granted, and that there will be no training in working things out for themselves.

Drs. Cowles and Davenport replied that there were many simple relations which they could work out for themselves.

Mr. Westgate related his experience in Kansas with two divisions of about twenty-five pupils each, in which the change was made from taxonomic to ecological study. They had field work twice a week. Both pupils and teachers were very well pleased with the change.

Miss Gloss thought that this sort of study was useful in making one see the things themselves as well as their relations.

Mr. Cole asked if the average pupil understood animals and plants well enough to be ready to go out and appreciate this work. He compared it to the late methods of teaching reading where the word is taught before the syllable, at the expense of the development of analytic powers. "Ecology is the sentence as a whole." "Laboratory work is the study of the alphabet." We should first build up the words from the letters.

Miss Snively agreed that acquaintance with individuals should come first, but thought that such instruction should come much earlier, so that the pupils would be ready for this sort of work by the time they reached the secondary schools.

Miss Barbour said that studying animals and plants in their relations was the place to begin. Study their homes, etc., first. Otherwise we are like those who are able to read, as far as pronunciation goes, a foreign tongue, but do not understand what is being read.

Dr. Cowles confirmed what had been said on both sides. The point he wished to make was that the pupils should be started as soon as possible in this line of work, that it is the important thing and should not be neglected.

Mrs. Cowles spoke of the methods used by Dr. Davenport at Cold Spring Harbor, viz., get the animals in their habitat and then bring them into the laboratory for further study and

acquaintance with them as individuals. This plan seemed to her to unite both views that had been expressed.

The next paper was on "Bird Study in City Schools," by H. E. Walter, Robert Waller High School, Chicago.

Bird study in city schools resolves itself naturally into the identification of birds during the spring migration. The fall migration is too difficult, owing to the imperfect plumage of the birds, while the study of nests and nesting habits is largely out of the question in city parks during the school year. Yet the same result that is sought for in the discipline of ecological study, namely, of training the pupil to really *see* things for himself in order that he may, as Dr. Cowles has said, "travel throughout life by day instead of by night," may be gained also by this other method.

Last spring eight of the fifteen public high schools in Chicago did some definite work with the bird migration. The particular method now to be explained was followed out in our school and it is given, not because it is the best way nor because it may be adapted to other cases, but because it is the evolution at which we, with our conditions, have arrived after five years of experimenting.

Before the migration begins in March three bird talks are given near by at the Academy of Sciences, illustrated by mounted specimens. The object of these talks is to enable the pupils who attend to identify some hundred birds when seen alive. The substance of these helpful notes and hints has been published in convenient pocket form under the title of *Wild Birds in City Parks*, and this little book is placed in their hands. They are now ready to begin going out mornings before school on the lookout for the first arrivals.

A large bulletin is begun at the school on which the name of each new bird is placed, together with the name of the pupil who is the first to identify the same to the satisfaction of the teacher. By rejecting rigidly all doubtful evidence and insisting on descriptions which are convincing, this bulletin hung prominently in the laboratory, becomes a sort of roll of honor and is a great incentive to accurate seeing. In addition, each pupil keeps a daily record on file in the laboratory, of all birds seen by him and in this record he is allowed to express his own untrammelled beliefs as to what he has seen—from English sparrows up to birds of paradise—regardless of what the teacher's verdict may be. It is interesting to note that the pupils honestly attempt to make these individual record cards reliable. They understand that their ornithological reputations are at stake. The fact that most pupils

begin when only a few birds have arrived, and that they see these repeatedly until they become sure of them, while each morning presents only a limited number of strangers, explains how it is possible to come to know quite well upwards of a hundred birds during a single spring migration.

The whole business is kept distinct from and independent of the regular school work. Only those who really want to do so take any part in it, and they are given no extra credit in their regular biology work. In fact they sometimes get up so early and stay out in the morning air of the park so long that they become sleepy and dull later in the day and their biology marks suffer in consequence!

Pupils are not urged into bird study. The teacher never descends to drumming up trade. The initiated pupils always attend to that. Many of the veterans of the previous spring are found among the green beginners, to whom they pass themselves off as oracles of ornithological wisdom. Most attention is given to the *best* pupils instead of, as is ordinarily the practice in regular classes, trying to prod up the hindermost. Consequently pupils learn that they are going to get out of this affair just what they themselves put into it, and not what the teacher gets out of them.

In order that the bulletin list may be a fair competition, the teacher *never identifies any bird for any pupil*, but simply confirms correct diagnoses. Excursions are avoided. Whenever by chance several happen to group together in the neighborhood of the teacher they are advised to scatter out. In fact his time in the park is often divided between watching for birds himself and in dodging those pupils who ought to use their own eyes and exercise their own judgment instead of his.

Any tendency on the part of certain pupils to vaporize or to substitute small talk and superlatives for real observation and appreciation of the birds is discouraged, and the attempt is made to give the whole subject dignity. In fact, as soon as it comes to be understood that the teacher is out because he wants to see the birds for himself, and is not out hunting pupils, the whole matter becomes worth looking into.

This early morning work enables the teacher to come into relations of comradeship and equality with his pupils that he may strive for in vain in the schoolroom where war is always tacitly declared. The best results of all for the pupil is forming the habit of really seeing things with his own eyes. This lays the foundation of the true interpretation of nature.

It was asked, what the chances for such work are in those parts of the city where there are no parks. Mr. Walter said that there would probably be at least seventy-five birds to be seen in any back yard where there are trees, and even where there are no trees there would be birds if anything.

Mr. Howe was of the opinion that bird study is essentially ecological. We must necessarily know a bird's habitat to be able to find it. "It is a study of distribution with reference to environment."

Mr. Walter said that while that was true, still most of the work consisted in plain identification of birds during migration, *i. e.*, out of their normal habitats.

Miss Snively told of her methods. She makes the pupils acquainted with the birds by study of skins. The children then colored sketches, and by that time were able to identify the birds as they saw them.

#### THE CHEMICAL SECTION OF THE CONFERENCE

met in Kent Chemical laboratory with Associate Professor Alexander Smith in the chair.

The first paper, of which an abstract follows, was read by Miss May M. Butler, of Riverside High School, upon the subject:

"The Treatment of the Science of Chemistry for Instruction in Secondary Schools; Is it Becoming too Academic?"

In our schools the course of study is planned on a more or less sociological basis, but when one comes before a class, what is taught in a subject and how it is taught depends, of course, on the point of view of the teacher, on the end at which he is aiming.

There are two points of view which control instruction today. One, to put it in an extreme way, where the end aimed at is the accomplishment of a certain *amount* of work, the amount and kind being determined by the scientifically trained adult mind, his mental attitude being imposed on the pupil. The object in view is to get the work done in the hope that somehow, in some mysterious way, the untrained youthful mind may develop by going through this amount of gymnastics.

The other end aimed at in instruction is the development of the power of the pupil and the enriching of his experience in his present

life among his fellows, the subjects chosen for certain periods being suitable to the stage of mental development and the present life interests of the pupil. Not only the subject, but the way of looking at the subject, is thus determined. The object to be attained in such instruction is to develop in the pupil the power to set up certain ends worth while and the ability to realize these ends as far as possible independently.

These two points of view, the first where emphasis is thrown on the work as the thing worth while, the pupil being there to accomplish it; the second where emphasis is thrown on the developing of the pupil in his *life relations*, as the thing worth while, the work being there as material for him to work over into his experience, thus broadening and deepening it, the material being something *real* to the pupil in his relations to life, not merely a sort of exercise to be gone through that he may be developed, these two points of view determine also the use made of text-books.

A teacher with the first point of view would prescribe the text as a beneficial allopathic dose to be taken from cover to cover, and laboratory work in science to be done exactly according to directions.

One with the second end in view would use the text as a source of information with which to broaden the experience that the pupil had already acquired by individual, independent experimentation.

Work in chemistry carried on in this way begins with a general discussion of the subject in hand based on the facts already known to the pupils. In this the teacher controls the trend of the discussion without adding information. The pupils know that certain facts are true. From these they infer that other things would be true. As there is always a tendency to lose sight of some of the controlling factors in natural phenomena and thus to make groundless assertions, those inferences and suggestions made by the class, not perfectly self-evident, are put by the class into the form of problems to be investigated.

Some of these problems are investigated by the individual for the benefit of the whole class, thus giving him a motive for careful work and clear explanation thereof. Other problems are investigated by the whole class, but with different materials, so as to give a broader basis for drawing conclusions; others are investigated by the whole class with the same materials, so that an average result of a larger number of data can be obtained. As an illustration, this year, after a few preliminary experiments, our first subject of study was water. In

the introductory discussion it was brought out that there were three large problems that they might investigate in reference to water: (1) The solvent action of water; (2) where water is found in nature other than in masses; (3) the chemical structure of water.

These problems, as they were taken up, were subdivided into many minor ones, such as: (1) Are solids in general unequally soluble in cold water? (2) Does an increase in temperature increase the solubility of solids in like degree? (3) Are liquids equally soluble in water? (4) Are gases equally soluble in water? (5) What effect has an increase in temperature on the solubility of gases? (6) What effect has a decrease in pressure on the solubility of gases? Such a problem as the first should be solved by the whole class using as large a variety of solids as possible, so as to give as broad as possible a basis for conclusion. . . .

The pupils are required, so far as is in their ability, to devise their own methods of solution, and to choose suitable apparatus. Thus, the properties of materials which have to be controlled in order to obtain the desired end force themselves on their attention. Devising their own methods develops considerable ingenuity, and often better results are obtained because the students have the method of procedure better under control than they would if it were some one else's method. Their work is less mechanical. A pupil who devises his own wash-bottle for washing a gas, or a safety-bottle, never attaches his wash-bottle with the wrong tube foremost, or uses a wash-bottle for a safety-bottle.

After the problems have been investigated, the pupils report their results to the class, and each pupil records the data, also the apparatus, and method of procedure, when the experiment has been performed by the individual for the class. From these they write up permanent notes.

The four preceding steps of the work—that is, (1) the general discussion; (2) the making of problems to be investigated; (3) the solving of these after an individually devised method; (4) the generalizations made from the work of the class—are broadened by reports from the text, so far as it supplies material, and from reference books which give condensed reports of other men's work along the same lines.

That pupils are capable of thinking out a related series of problems and from them forming some appreciation of truly scientific work may be illustrated by the following set of problems, thought out step by step by the class last year.

The large problem in hand was to determine the chemical structure of water. After having found out by electrolysis that hydrogen and oxygen could be obtained from water and sulphuric acid in the approximate proportions 2 : 1 they did not know whether the gases came from the water, or the sulphuric acid, or both. So it was proposed to unite hydrogen and oxygen in the proportions 2 : 1 to see whether water was obtained. This necessitated the following investigations : (1) Can hydrogen be obtained from an acid and a metal ? (2) Does the concentration of the acid effect the result ? (3) Which combination of acid and metal produces the largest quantity of hydrogen ? (4) Will oxides give off oxygen when heated ? (5) Which oxide gives off the largest quantity of oxygen ?

After having obtained oxygen and hydrogen from the best materials, and having united them in the proportions 2 : 1 or what they thought was 2 : 1, when the result was not what they thought it would be after several repetitions, they began to look about for sources of error, and the following problems were suggested : (1) How does the volume of a gas vary with the pressure, the temperature being constant ? (2) How does the volume of a gas vary with the temperature under constant pressure ? Then a recalculation of data after several more repetitions gave approximately correct results.

When the reference reading on the determination of the structure of water by different scientists was done they called attention to the fact that Morley did the experiment twenty times before he was satisfied with the results and that Cavendish's method was neater and more simple than theirs.

As to the relative merits of these two methods of instruction :—The one, where the pupil is given a manual with full directions for each experiment which he performs carefully, gives him a narrow view of the subject. He knows, for example, only one or two ways of making oxygen and hydrogen, and each experiment, to him, must be set up in one definite way. He forms also no appreciation of the significance of scientifically accurate results.

The second method gives the pupil more command of the subject, more breadth of view and independence in work and thought. He has materials under his control better and is better prepared to go at further work in a scientific way.

There is a tendency to make the work too academic if the present text-book is chosen with the intention of getting it into the pupil's memory from beginning to end. There isn't any danger, however,



if the teacher keeps the pupil's ability to think and work constantly in mind.

In the general discussion which followed the reading of the paper, it appeared that some of the members of the conference thought that the heuristic method, as outlined in the paper, would not yield satisfactory results in practice. It was thought that, by a strict application of these principles, the student would be able to cover very little ground. Such a course was called nature study, and not chemistry. How can the student be expected to invent those processes and discover those methods which have been the result of the work of years of skilled chemists? How, for example, could a student be asked to construct a wash-bottle? The teacher may make suggestions, but these would have such great influence in shaping the student's view that it was thought better to give definite and complete instructions at the start regarding the experiments to be performed. In the replies to these criticisms it was pointed out that the aim of a secondary-school course in chemistry is not to turn out finished chemists. The aim is not to confer a definite amount of chemical information or to require the performance of a certain fixed number of experiments. Its real object is to develop the mental power by logical reasoning and appropriate methods of experimental investigation. At the same time the work done leads to results which are of real worth as an accession to the pupil's fund of useful knowledge. They have an additional value in that he knows just how they were obtained. He has learned from his own experiments the way in which all scientific knowledge is obtained.

It was admitted that it would be unreasonable to expect the pupil to rediscover any very great amount of chemistry. He may learn much, however, from very simple experiments. For example, it is not too much to expect him to discover how and why iron rusts in the air. He may study with success the question of solubility or condensation of steam. It was thought better to give simple problems and let the pupil work them out for himself. Even if the pupil fail to discover the solution of any given problem, he is benefited by having thought about it.

By allowing students to devise their own experiments the habit of independent thinking is greatly developed. This is probably the most important argument in favor of the heuristic method. It was the opinion of many that, although a course should not consist entirely of work of this sort, an infusion of a considerable portion of such work, even if it diminished the ground covered, would be exceedingly valuable.

The following persons took part in the discussion: Messrs. Abels, Ames, Boynton, Burns, Easton, Flynn, Hawthorne, Linebarger, Meslick, Alexander Smith, A. L. Smith, Spicer, Walker, Watson, and Misses Chapin and Butler.

The second subject was on "A Minimum Outline of Chemistry for Secondary Schools." The discussion was opened by Mr. C. M. Wirick, of the English High and Manual Training School, Chicago. The speaker indicated his object in teaching as twofold. First, training, and, second, to give the student enough chemistry to understand the universe. The outline included a selected list of topics. It cannot be given here as there is not space to include the remarks showing the aspect of each subject to be presented and the mode of relating each to the others.

Mr. Flynn, of Hyde Park High School, the second speaker upon this topic, stated that his outline would be even less extensive. He favored the omission of the ionic theory and also of the law of Avogadro, as the latter is too important to be treated briefly. He also thought it was not necessary to try to write accurate and complete equations to represent chemical actions. The course as outlined included the following: Fuel, air, hydrochloric acid, acids, bases, oxygen, basic oxides, acid anhydrides, sulphuric acid and compounds of sulphur, nitric acid and oxides of nitrogen, ammonia; and the following typical metals: sodium, potassium, calcium, copper, mercury, silver, aluminium.

After the discussion of the above papers, Dr. Linebarger described several new experiments. Dr. Walker described the method of preparation of Welsbach mantles and exhibited samples of the mantles and burners.

## THE CONFERENCE IN ENGLISH

ASSOCIATE PROFESSOR HERRICK, Chairman.

The conference of 1900 had demanded greater latitude in the teaching of English literature and the history of English literature than is provided for in the university entrance requirements. The English department, in considering the advisability of modifying its entrance requirements, made a thorough investigation of the curricula at present established in the secondary schools. A report, based upon this investigation, was made by the departmental examiner.

The following facts were emphasized in this report:

1. The high-school course is too brief to permit of more instruction in English literature than is provided for in the university entrance requirements.
2. Teachers who have mastered the English classics, included in the university list, find them the most effective instrument for teaching the history of English literature.
3. The present need is not for a modification of the university entrance requirements, but for a body of teachers so trained as to be able to use the English classics, included in the university list, intelligently and effectively.

Other facts, revealed by the investigation, but not bearing directly upon the question before the conference, were as follows:

In many schools the entire instruction in English literature and composition is in the hands of a single teacher. Inasmuch as one teacher, unassisted, cannot simultaneously conduct four classes in English literature and four classes in English composition, a compromise has been adopted in many schools by which approximately two years are devoted to each subject. As a result, students from these schools enter the university without a thorough appreciation of the English classics and with inadequate training in English composition.

In the general discussion following the reading of the report, the demand for greater latitude in the choice of supplementary reading was renewed. Upon the motion of Professor MacClintock, provision was made for a committee, whose duty it will be to prepare a list of supplementary readings for the use of secondary schools.

## THE CONFERENCE IN FRENCH

MR. H. PARKER WILLIAMSON, Chairman

The first paper, on "Composition," was read by Miss Berthe des C. Favard, of the Hyde Park High School. She spoke for simplicity in composition and for the unity of the phrase. Miss Favard spoke in French and presented a carefully written paper.

The second paper was by Professor Monin, of the Armour Institute. He treated the subject: "What French and how much French should be read in the first year of a college preparatory course?" His main points were for some scientific reading and emphasis on dictation.

There was discussion between M. Sicard, Dr. Pietsch, and Dr. Jenkins.

Dr. Pietsch stated that hereafter the instruction in French in the Romance department will be given along the lines recommended by the *Report of the Committee of Twelve*, the study of which he warmly recommended to the attention of the teachers.

## THE CONFERENCE IN GERMAN

DR. P. O. KERN, Chairman

1. In accordance with the motion passed at the last annual conference, a committee of five representing the university, the affiliated, and the coöperating schools had been appointed to revise the list of books prescribed for second-year reading. Its report, agreeing in substance with the recommendations of the Committee of Twelve of the Modern Language Association of America, was submitted by Mr. Karl Seeligmann (Harvard School), chairman, and accepted. These new requirements for German 2) which will go into effect September, 1902 (optional until that date), are:

This examination calls for the reading of about 400 pages of moderately difficult prose and poetry, with constant practice in giving, sometimes orally and sometimes in writing, paraphrases, abstracts, or reproductions from memory of selected portions of the matter read; also grammatical drill upon the less usual strong verbs, the use of articles, cases, auxiliaries of all kinds, tenses and modes (with special reference to the infinitive and subjunctive), and likewise upon word order and word formation. Suitable reading matter (five

books) must be selected from the following : Andersen's *Märchen*, or Andersen's *Bilderbuch ohne Bilder*, or Leander's *Träumereien*—to the extent of about forty pages; after that Hauff's *Das kalte Herz*, or Zschokke's *Der zerbrochene Krug*; then Hillern's *Höher als die Kirche*, or Storm's *Immensee*; next one of the three selections in Nichol's *Karl der Grosse nebst zwei andern Bildern aus dem Mittelalter* (Freitag), preferably *Aus dem Klosterleben*; or Schiller's *Wilhelm Tell*; lastly, Benedix's *Der Process*, or Wilhelm's *Einer muss heiraten!*

2. The main feature of the program was the discussion of the question: "Should teachers of German aim at some acquaintance with the historical development of the German language and literature?" The subject was introduced by two papers given below, which were followed by a lively debate, the final decision being in the affirmative. Members present, 50.

#### THE LINGUISTIC ASPECT OF THE QUESTION

DR. KERN

I wish to present this afternoon some of the points in which a knowledge of the historic development of the German language has been of practical help to me in teaching the German of today to elementary classes.

1. After a few introductory remarks about the relation between the English and German races, the study of cognates may very well be begun with the first vocabulary. The law for the changes in the consonants may be discovered by the class or, according to the method pursued, briefly stated by the teacher. Take, for instance, the dental series; of what beautiful simplicity are rules such as: To English *d* corresponds *t*, to English *th*, *d* in German. Can a teacher afford not to avail himself of these? Starting with the English the teacher can make his students construe the consonantal skeleton of hundreds of German words, *e. g.*, *beam*—*Baum*, *hail*—*Hagel*, *nail*—*Nagel*, *light*—*Licht*, *wight*—*Wicht*, *dapper*—*tapfer*, *pepper*—*Pfeffer*, *stroke*—*Streich*, *token*—*Zeichen*, *pea (cock)*—*Pfau*, *plight*—*Pflicht*, *leap*—*laufen*, *soap*—*Seife*, *tiding*—*Zeitung*, *timber*—*Zimmer*, *twig*—*Zweig*, *water*—*Wasser*, *scuttle*—*Schüssel*, *thatch*—*Dach*, *loath*—*leid*, *cloth*—*Kleid*, *heath*—*Heide*, *harvest*—*Herbst*, *starve*—*sterben*. The few exceptions may be ignored in the beginning. The English consonants being usually the original ones, all that the instructor has to know is the second sound-shifting which separates the high German consonantal system from that of the rest of the Germanic languages. The larger German grammars give the

results of this important process in a clear form, the task of mastering them is easy and the teacher is amply repaid for his labor by the amount of memorizing which he spares his class.

Not unfrequently, however, cognate words differ not only in form but also in meaning in the two languages. Though here general laws cannot be established, the change ought to be explained in every individual case, *e. g.*, *fee*—*Vieh* (cf. Latin *pecus*, *pecunia*), *stove*—*Stube* (originally the room that could be heated), *town*—*Zaun* (the old towns were fortified), *read*—*raten* and *lease* (glean)—*lesen* (guessing and picking up of the *Buchstaben*), *write*—*reiszen* (cutting of the Runic characters in the wood; *Reisznagel*, *Reiszbrett*, *Abrisz*), *shrive*—*schreiben* (dictating a punishment), *cup*—*Kopf* (cf. Latin *testa*—French *tête*, German *Tassenkopf*), *top*—*Zopf* (even the men wore their hair tied up on the top of their heads), *lunacy*, *avoir des lunes*, Latin *luna*—*Laune* (relic of the mediæval belief in the influence of the moon on the disposition). Sometimes we notice a development of meaning in *malam partem* in one of the languages as in the following instances: *knave*—*Knabe*, *knight*—*Knecht*, *slight*—*schlecht* (but: *schlecht und recht*), *lust*—*Lust*. At other times we notice a narrowing down of the meaning as in *dumb*—*dumm*, *small*—*schmal* (but: *schmälen*), *fret*—*fressen*, *vane*—*Fahne*, *titter*—*zittern*, *chafer*—*Käfer*.

The introduction of such bits of culture-history, of philosophizing or whatever else may have caused the change in a given case, all this will enliven the dulllest vocabulary. The added human interest will make the word cease to be a mere form to the student and change the committing of new words to memory from an irksome task into a pleasure. In his attempt to connect the meanings of cognates, the teacher will now and then be compelled to go back to the fundamental meaning, as in: *sad*—*satt* (fundamental meaning: *heavy*; *sad bread*, *sadiron*), *dimple*—*Tümpel* (root meaning: *tief sein*), *clean*—*klein* (originally: *shining*; *Kleinod*). In most cases *Kluge's Etymological Dictionary*, *Paul's Deutsches Wörterbuch*, or *Eberhard's Synonymisches Handwörterbuch der deutschen Sprache*, Leipzig, 1896, will easily furnish the teacher the necessary information.

2. In the nominal inflection the decay of the English endings due to the strong stress on the first syllable, and the crowding in of French *s* as a sign for the plural have almost entirely effaced the old Germanic declensions and their classification. Yet the little that is left can well be utilized in the German class room. It may be pointed out that the *s* of the German strong genitive survives in the English possessive

which has been generalized. For other remnants of Germanic inflection we must turn to the so-called irregular plurals in modern English. *Mice, teeth, geese*, etc., belong to the strong declension and illustrate the umlaut as *men* and its compounds do. Such words as *children, brethren, oxen* introduce the student to the German weak declension. The uninflected plural of the first strong declension finds its parallels in two classes of modern English words. The first class consists of such collectives as *deer, sheep, swine, horse*, Anglo-Saxon neuters that did not take an ending in the nominative and accusative of the plural. Alike in singular and plural, both in Anglo-Saxon as well as in Old High German, were further such neuters as *year, Jahr, pound, Pfund*. This accounts for such constructions as *a three year old child, a ten pound note, drei Jahr alt, zwei Pfund Zucker, sechs Mal*, and leads to the modern German rule that all but feminine nouns expressing weight or measure do not take the sign of the plural. The masculines followed the neuters by analogy, *a three foot rule, drei Fuss vier Zoll*; the majority of the feminines were weak and have always had a characteristic ending for the plural. As the uninflected plural cases of the neuters, traces of which are found even in New High German (e. g., *Kind und Kindeskind*=*children and grandchildren*), did not admit of a differentiation from the singular, *er* and *e* become the new signs of the plural. *Die Feld, die Haus* become *die Felder, die Häuser* while the old datives survive in proper names, e. g., *Rheinfelden, Schaffhausen*. *Er*, which already occurred with Old High German neuters, becomes so common that it even enters the inflection of the masculine. It gives rise to that class of masculine nouns that follow the paradigm *Wald, Wälder*; vacillation between the masculine and neuter genders (*Gott*) or analogy to neuter nouns (*Wälder-Felder*, but *Unterwaldden; Männer-Weiber; Kinder*) ushered in this confusion. *E*, originally the ending of the strong masculines, now forms a subdivision of the second strong declension: *Jahr, Jahre*. The two ways of forming the plural may be observed on the same stem: *Lande, Länder; Worte, Wörter*, etc.

In the weak declension, the annoying mistake of giving the strong inflection to the well-known list: *Fürst, Graf, Herr*, etc., may easily be avoided by pointing out that these nouns only recently lost their final *e* and ought to be grouped with *Knabe*. They occurred frequently as titles, i. e., before accented proper names, and thus were naturally shortened. Many deviations from the modern weak norm might easily be mentioned here. *Festgemauert in der Erden, Röslein auf der Heiden*,



*Darf mich leider nicht auf der Gassen, So wird doch Deiner Seelen der Bräutigam nicht fehlen* or such compounds as *Sonnenlicht, Harfenton, Erdenkind* or *Ich rufe Paulinen* and similar survivals of older usage are well explained in *Friedrich Blatz, Neuhochdeutsche Grammatik mit besonderer Berücksichtigung der historischen Entwicklung der deutschen Sprache*, 2 Bände, Karlsruhe, 1895, also in *Karl Gustaf Andresen, Sprachgebrauch und Sprachrichtigkeit im Deutschen*, Leipzig, 1892. Neither book presupposes a knowledge of the old Germanic dialects.

I cannot leave the noun without referring to the mixed inflection which is difficult to handle because it follows so closely in the wake of the four declensions. A good list of the more common mixed nouns is given in *Joynes-Meissner, Lesson V*, of course without explanations. The subject being somewhat complicated, I will take up only a few words of this class. To show how easily a confusion might arise, it is a good plan to write two Early Modern High German paradigms side by side, that of the strong noun *Wagen* and any weak stem:

<i>Wagen</i>	<i>Name</i>	<i>Wagen</i>	<i>Namen</i>
<i>Wagens</i>	<i>Namen</i>	<i>Wagen</i>	<i>Namen</i>
<i>Wagen</i>	<i>Namen</i>	<i>Wagen</i>	<i>Namen</i>
<i>Wagen</i>	<i>Namen</i>	<i>Wagen</i>	<i>Namen</i>

The only difference between these existed in the nominative and genitive of the singular which led to modern *des Namens* and to the by-form *der Namen*. Sometimes we find a strong verbal noun of the same stem by the side of a weak noun: *das Glauben, des Glaubens—der Glaube, des Glauben; das Schaden, des Schadens—der Schade, des Schaden*. In some cases the cause of the confusion was a change of gender: *Stachel, Mast, See*, now masculine nouns preserved their old feminine plurals. In the modern singular *Sporn* we really have an old plural (a pair of spurs), the old singular being still retained in the proper name *Spöhr* (= English *spur*). At present this word has three plurals: *Sporen* (the historically correct and best form), *Sporne* (from the new singular, perhaps under the influence of *Dorne*), and *Spornen*, the youngest formation, a contamination of *Sporen* and *Sporne*, or in analogy to *Dornen*. Others of these nouns as *Bayer, Stiefel* were formerly strong and needing a distinguishing feature took *n* in the plural. Others again as the weak *Vetter, Bauer* were drawn over to the first strong declension by *Vater, Bruder*.

3. The Verb. In the strong conjugation the fact that the older periods of German as well as English possessed four principal parts explains a number of forms which would have to be treated as irregularities from

the standpoint of today. The old preterit embraced two principal parts, one vowel occurring in the singular indicative and usually another in the plural and the subjunctive. The Middle High German principal parts of *werfen* were, e. g., *werfen, warf—wurfen, geworfen*. As a rule a leveling out took place in Modern High German; sometimes, however, we find the two old forms retained. Thus we find the old vowel of the plural not unfrequently in the classics of the eighteenth century. On account of the rhyme the proverb remains: *Wie die Alten sunen, so zwitschern die Jungen*. The modern poetic forms *thät, thäten* are not subjunctives but old indicatives; Schiller says: *Ich thät's vor kurzem selbst erleben*; Uhland: *Er thät nur spöttisch um sich blicken*. The old preterit of *thun* was *thet—thaten*, later on the vowel of the plural was generalized. Leveling out in favor of the vowel of the singular, we find in Goethe's: *Die Augen thäten ihm sinken*. General is the retention of the old vowel in the preterit subjunctive of such verbs as, in the spoken language, would not have differentiated their new subjunctive from the present indicative: *würde* (*wärde = werde*), *würbe* (*würbe = werbe*), *gälte* (*gälte = gelte*), *hülfe* (*hülfe = helfe*), etc. The historically correct preterit of *werden* is *ward—wurden*; not only did *wurden* survive, it even entered the singular as *wurde*. By calling the modal auxiliaries preterit-presents, i. e., old strong preterits in form that later took on the meaning of presents, they can easily be explained in this connection. *Darf—dürfen*, e. g., goes like *ward—wurden*. Their new preterits and participles were then naturally weak, they were formed upon the plural the vowel of which occurred most frequently in the tense: *dürfen, durfte, gedurft*. Compare modern English *dare, durst* or the vulgar *he had ought to go*. At this juncture I should like to call attention to a mistake not yet eliminated from a number of grammars which continue to translate *to dare* by *dürfen*. *Dürfen* is not cognate with *dare*. Old High German *durfan* corresponds to Anglo-Saxon *thurfan* which is lost in Modern English. The cognate of *to dare* is Luther's *ich tar, wir türren* which, in the seventeenth century, shared the fate of English *thurfan*. Passages in which the meaning of *dürfen* has changed to that of *dare* may be found, it is true, in Fischart, Opitz, Grimmelshausen, Hagedorn, and in Swiss authors, but they are rare and not upheld by present usage.

A question occurring whenever a class comes to *gehen* and *stehen* is why these two strong verbs are not conjugated *du gehst, stiehst*, etc. By putting *ging, gegangen* side by side with *fangen, fing, gefangen*, it

can easily be shown that *gehen* is irregular; it is a different stem. The old infinitive *gangen* now lost to the literary language survives in the dialects as does the Scotch *to gang*. *Gehen*, English to go, had as some of the weak verbs no vowel *i* in the ending and could, therefore, not change the stem vowel in the singular present. The English preterit *went* is German *wendete*; the participle *gone* comes from the short stem retained in a still shorter form in modern *ago*. The verb *stehen* ought to go in German: *standen*, *stehen*, *stund*, *gestanden*, in English *stand*, *stood*, *stand*. The infinitive *standen* surviving in South German dialects is superseded by the stem *stehen* in the literary language. *Stund* is the regular form in Goethe's *Götz*; *stunden* occurs in Goethe's *Werther*: *Die Augen stunden ihm voll Thränen*, also in Schiller, e. g., *stund er noch an sich zu erklären*. *U* is further found in the subjunctive *stünde*. *Stand* crowded in from the participle under the influence of such forms as *band*—*bunden*, *fand*—*funden*; in English, the reverse has taken place the vowel of the preterit having been generalized.

In speaking of the endings of the verb it is well to remember that German as well as English *e* in unaccented syllables does not represent the full vowel but expresses a slurred obscure sound. It may have resulted from any one of the vowels (cf. English *beggar*, *copper*, *zephyr*, *camphor*, *sulphur*). In the second and third singular present indicative of the strong conjugation its prototype was *i*; the Old High German forms of *tragen* were *tragu*, *tragis*, *tragit*. This *i* caused the umlaut and in case the stem-vowel was *e*, this *e* was changed to *i* (*brechen*, *brichst*, *bricht*). The old forms *fleugst*, *fleugt* as compared with *fliegen* have to be explained in the same way. In the weak conjugation the same vowel followed the stem in all persons, therefore the latter cannot vary (cf. Old High German *salbōm*, *salbōs*, *salbōt*). If a strong verb has become partially weak, the vowel of the infinitive may remain (*du backst*, *er ladet* by the side of *bäckst*, *lädt*); if a weak verb shows strong by-forms, umlaut may appear (*fragst*, *frägt*). In the old preterit subjunctive the ending was likewise *i*, therefore, modern German *trüge*. Umlaut also explains the class of the so-called *rückumlautende* weak verbs which formed their preterits without a connecting vowel. *Brännjan*—*branta* had to give *brennen*—*brannte*; *taljan*, *tellan*—*talde*, *tell*—*told*. The vowel of the preterit, then, is here the original vowel, the *e* of the present its umlaut.

As the strong verb expresses the idea of the past by an internal change, the first and third singular preterit indicative have always been

without endings. This accounts for the uninflected *ich, er, kann, I, he, may*, etc., *ich, er, weiss, I, he dare*. In *he* need an ending was dropped. *Wurde*, so frequently used as auxiliary, owes its *e* to a confusion with the weak conjugation. It is the only remnant of a long list of contaminated forms of the early Modern High German period (*sahe, schalte, schwiege, sotte, sprange*, etc.) that has left frequent traces in the classical literature. English *shalt, wilt*, correspond to Middle High German *solt, darft*, which latter *t*-forms are still quite frequent in Herder.

The Germanic past participle had as the Gothic shows, originally no prefix. But the older idioms possessed a number of compounds with the prefix *ge* which often expressed completed activity. Naturally then the compound forms were chiefly used in the past participle and gradually became characteristic of it. Their use predominated over the short participle in Anglo-Saxon, many *y*-participles (into which they developed) may still be found in Shakespeare and Milton; in Byron occur *yclad* and *ygazed*. In German the *ge*-participle has been the rule. Exceptions are 1) those verbs that are already compounded with an inseparable prefix, 2) the foreign verbs in *ieren* which were framed under French influence; 3) the auxiliary *werden*; 4) old participles that survived as adjectives such as *rechtschaffen, trunken*; 5) the Low German verb; 6) South German dialects whenever the verb begins with an explosive. After the dropping of the *e* of the prefix, *g* was assimilated to the first consonant of the stem: *geklungen, g'klunge, klunge*. These contractions are not unknown to our poets: *Das Werk zuletzt ist doch vollendet blieben* (Goethe), *Hamster hat mich bisßen* (Uhland), *der Vater ist gangen, die Wölfe zu schießen* (idem), *Bist du hierher kommen* (Schiller), *Still ist schon das ganze Darf, alles schlafen gangen* (Lenau); 7) such contractions as *ich habe arbeiten können, lassen* where now owing to the lack of the prefix, the form appears to us as the infinitive. In *ich habe arbeiten hören, i. e.*, whenever a weak verb occurs, we have a case of analogy. Information on this or similar points may be found in *Behaghel's Deutsche Sprache, volume 54* of the popularly written *Wissen der Gegenwart, Deutsche Universallibothek für Gebildete. Leipzig. G. Freytag*.

In discussing our subject, I have so far endeavored to show why it is good policy for a teacher of German in this country to present his subject in the light of a language cognate to the English. We were naturally led to the older periods in both, because cognate languages must necessarily resemble each other more and more the nearer they approach their common source. The knowledge of the historical

development of a language does, however, not only facilitate comparison between kindred idioms, it also ensures to its student a fuller and better understanding of its present form and meaning. To illustrate this briefly, I will mention in conclusion some metaphorical expressions many of which reveal their full significance only to him who has traced their origin. *Zum Kuckuk, geh zum Kuckuk, der Kuckuk mag es wissen, der Kuckuk hole ihn, des Kuckuks werden*, etc. The cuckoo was considered by the old Germans to be a prophetic bird. After their conversion to Christianity which changed all the gods of heathendom into demons, it became the bird of the Evil One and Kuckuk was often used directly for *Teufel*. *Bei einem etwas auf dem Kerbholz haben*. The tally was a stick on which incurred liabilities were marked by means of cuts. The usual way of proceeding was this. A stick about one foot long was cleft into two narrow sticks which of course would fit exactly into one another. The one stick was taken by the creditor, the other by the debtor. Each time a new debt was incurred the two sticks were joined together and marked by a new horizontal line which was cut into both. *Jemand einen Korb geben, einen Korb bekommen, sich einen Korb holen*. The lover used to be hauled up in a basket to the window of his lady. In case he was not welcome, she dropped the basket or arranged so that it should break. In the more civilized seventeenth and eighteenth centuries the progress was simplified, the cold maiden saved her lover the trouble of the fall by sending him a bottomless basket in reply to his declaration. The custom still exists in a somewhat modified form in some rural districts of South Germany. *Stein und Bein schwören*. If a person in the Middle Ages had to swear an especially solemn oath, he was taken to the church and there swore by *Stein* and *Bein*. The *Stein* was the altar, the *Bein* the relics, the bones of the Saints. *Einen bei den Schlafittchen kriegen*. *Schlafittchen* is a corruption of the *Schlagfittiche*, the pinions of birds. *Sein Schäfchen ins Trockene bringen*. The fisherman of the German ocean calls his fishing smack, which at the approach of winter he beaches and pulls under a shed for shelter, *Schepken* (*Schiffchen*). The Low German term being misunderstood in the interior of the country became *Schäfchen*. Often a single word conveys as much as a whole sentence. The *Prügel-junge* was a creation of the old pedagogy. If young princes or noblemen deserved some corporal punishment, it was inflicted in their presence and for their benefit upon some boy who had been formally appointed for this office. He was their *Prügeljunge*. Such were kept e. g., for King James II. and Charles II. of England in their youth.

What is the meaning of *Schranze*? In Middle High German it meant, *cleft, rift*, then a *slashed garment*, then a *young man with slashed sleeves, an overdressed young man, a fop, a parasite*. The word *Zapfenstreich* originated in the camps of the Thirty Years' War. To somewhat check the revelry and riotous living of the soldiery, the sutlers every night upon a given signal had to drive the plugs into the wine and beer barrels. To prevent the unlawful reopening of the same, the provost made the rounds of the camp drawing a red pencil mark over barrel and plug. This is the *Zapfenstreich*, Hollandish *taptoe* (i. e., *Zapfen zu*), English *tattoo*. The German *Elend* is a compound of *eli* (Latin *alius*) and *Land*, meaning *foreign land, exile*. Thus living abroad and living in misery were identical to the Old German mind. A present was called an *Angebinde*, because it was actually tied to the child's neck or arm on its birthday. *Schlaraffen* have been known since Hans Sachs who discovered *Schlaurlaffenland*. *Schlaur* is the Low German *sluren* (to scuff), a *Schlaraffe* is thus originally a person too lazy even to lift up his feet in walking. Numerous instances of this sort and their explanations are contained in the following two collections: *W. Borchardt, Die sprichwörtlichen Redensarten im deutschen Volksmund, nach Sinn und Ursprung erläutert, Leipzig 1888*; *Dr. Hermann Schrader, Der Bilderschmuck der deutschen Sprache, Weimar, 1896*.

"The Literary Side of the Question," Assistant Professor Von Klenze:

It is a fact that the study of German texts chosen even from the masterpieces of German literature only in rare cases quickens the literary insight of students. The fault lies only partially with the student himself. Often teachers have not attempted to train themselves in literary appreciation, and do little to interpret the text as a work of art. In order to remedy such difficulty it is imperative that all those whose province it is to teach literature, no matter in how simple a form, should acquaint themselves with some of the best literary work of the world. But it is not enough to appreciate the literary value of the text in hand in order to convey to the student its full significance. Even simple texts, as for instance certain Lyrics of Goethe, particularly however some of the dramas of the classical German period, cannot be understood with all the thoroughness which may be expected in modern times without some appreciation of the background, of the times which produced them. Schiller's "William Tell" becomes more intelligible

and more interesting when the student becomes aware of Schiller's intellectual development, when the desire for liberty which pervaded the times, when the American Revolution and the French Revolution are brought into relations with the play.

The average teacher, over-worked as he is, finds little time for studies of this kind, carried on on a large scale. But it is possible for everyone to do something in order to prevent the text from remaining a mere collection of examples to illustrate grammatical rules.

#### THE CONFERENCE IN GREEK AND LATIN

ASSOCIATE PROFESSOR F. J. MILLER, Chairman

The first paper presented was by Professor H. W. Johnston, of the University of Indiana, upon the subject, "The Teaching of Second-Year Latin." The paper follows:

Reports from the high schools of Indiana show that the work of the second year in Latin is very generally disappointing to the teachers. The work of the first year is made irksome by the presence in the classes of many pupils who, for various reasons, ought not to study Latin at all, but must try the work because it is by actual trial only that the fit can be distinguished from the unfit. By the end of the year, however, most of these incapables have been discovered and removed, and the second-year classes ought to start, and, as a rule, do start, with pupils only whose records show that they are able to learn Latin and whose presence shows that they want to learn it. They are, therefore, a picked lot, and the year ought to be one of pleasure and profit to the teacher and the taught. As a matter of fact, almost as large a percentage of failures is recorded for the second year as for the first, and the Hoosier schoolmaster is anxious to know why. His being a Hoosier schoolmaster makes him all the more anxious and eager to find the cause. People are not bound by traditions in our state. Parents do not make their children study a given subject just because they studied it themselves, and their fathers before them. If the Hoosier schoolmaster cannot make the study of Latin show results commensurate with the time and effort it takes, he must expect to see his classes deserted for the history, German, or science that may be taken instead. We do not have even the fetish of the bachelor of arts degree to keep our Latin classes full. In the State University, for example, only about one fourth of the candidates for the bachelor of



arts degree who entered this fall are taking Latin, and of these any may discontinue the study at the end of a single term.

This being the state of affairs, we have done our best to discover the cause of the failures in the second year, because the trouble seems to go no farther: pupils once in the third year are almost certain to finish the course successfully and happily. We have looked in every direction for counsel and help. Wherever a prophet has lifted up his voice we have hearkened diligently. A prophet told us that our teachers lacked preparation. We have put our Latin classes in almost all our schools into the hands of graduates of colleges, in most cases the teachers being what we call specialists, but the trouble is not removed. A prophet told us, and I want to get his exact words, that the "difficulty is inherent and inseparable from the transition from detached and isolated sentences to continuous narrative." That did not help us much. Continuous narrative ought to be easier than detached and isolated sentences, and we believe in getting into it as soon as possible. It would be better if we started in it. A prophet told us that Cæsar was too hard for second-year work. We substituted Nepos, and Eutropius, and *Viri Romæ*, and all sorts of things, only to find that while the death rate of the second year was lowered, that of the four years was as high as before, and the survivors lacked in many cases the vigorous constitutions their predecessors had had. These last few years I have been doing a little prophesying myself, and it is to this voice crying in the wilderness, the wilderness of Indiana, that you are now invited to listen, because it is believed the conditions in adjacent states are not essentially different from our own.

Some time ago I stood at the door by which a crowd of second-year students was entering a high school, and at my request the principal stopped about a score of bright-looking boys and girls long enough to put two questions to each of them. The first was: "Do you know your algebra lesson this morning?" The answer in every case was a decided "Yes, sir," or "No, sir." The second question was: "Do you know your Latin lesson this morning?" We did not get a ringing "Yes, sir," from a single pupil; even the best of the lot, those who made creditable records in their Cæsar, when they recited a few minutes later, ventured nothing more decided than "I hope so," or "I think so." The principal did not need to sit with me, as he did, through the recitations of three sections of that Cæsar class to find out the trouble. The algebra lesson was a fixed and definite thing. Every pupil knew before he entered the recitation room just

about what questions would be asked, and he knew, of course, whether or not he could answer them. No boy could guess what he was to be asked in his Latin class, and his preparation was therefore vague and necessarily unsatisfactory to him.

Perhaps it is worth while to describe the three recitations that I heard. The lesson was the same in all, and in all the first thing done was the translating of the text in the ordinary way. After each student had translated the part that had fallen to him, the teacher asked questions suggested by it. In the first section the moods and tenses made the important thing. Not a verb was passed unnoticed, and the last had hardly been satisfactorily done when the bell rang and the class was dismissed with the brief direction: "Take the next fifteen lines." In the second section the verbs escaped, but the cases were made the subject of the closest possible scrutiny; every ablative and dative, and so on, was explained and labeled as the moods had been before. I remember that one little girl cried because she could not explain, or rather name, the use of *moribus* in chapter IV of the first book, though she knew it was an ablative and had translated it correctly. I suppose she was naturally dull. I forgot the name myself before I got home and took the trouble to look it up; one grammar called it the ablative of attendant circumstances, another the ablative of cause, another the ablative of specification, another the ablative absolute. I am waiting with interest for the coming of the great grammar, in order to find out for certain what the little dunce was crying about. The third section spent most of its time on the same word, *moribus*, but the word was made the text for a very interesting and profitable exposition of the Keltic administration of justice. These two sections were also directed to take the next fifteen lines. Don't you think the boy was in hard luck who had got his cases up in good shape that day and found himself in the section that was doing verbs? Do you think there was as much variety in the recitations of the three sections, if there were three sections, of that algebra class?

It is probably unnecessary now for me to say that, in my opinion, the trouble with the work of the second year is not due to the difficulties "inherent in and inseparable from the transition from detached and isolated sentences to continuous narrative," or to the lack of preparation and training on the part of the teacher, or to the particular author taught. It is due, nine-tenths of it at least, to the failure of the teacher to so assign the lessons and conduct the recitations that the pupil may make adequate preparation for them, or, in other words,

to hazy, indefinite, and shifting methods of teaching. I anticipate two objections. It is contended that mathematics and language are essentially unlike, and that the instruction in the latter cannot be made so definite and precise as in the former. I admit the difference between the subjects, but I shall try to show that, so far as concerns the second year, the teaching of Latin may be made practically as positive and direct as that of algebra. It is also contended that the work is definite now, that all the matters covered in the three sections that I heard recite are properly connected with a study of Cæsar; that the class must understand the uses of moods, tenses, and cases, must be made familiar with Gallic customs, and British and German and Roman also, in order to understand the story that Cæsar is telling. I admit this, too, but I insist that these matters are not of equal importance, that some must be passed over very lightly at first, that others may be postponed indefinitely without serious interference with the work of the year. I learned long ago that the golden rule of all good teaching is: Never do today what you can postpone until tomorrow. Let me show you how I would teach Cæsar or whatever author is studied in the second year. I shall call the subject Cæsar, for short.

At the outset I should take one of the matters mentioned above and give it first place. I should not merely give it first place in my own mind, but I should tell the class plainly that it is the all-important thing, and that any pupil who prepares that thing well from day to day may feel sure that he is doing his work satisfactorily to me, if all else is left undone. For many reasons, that I cannot stop to give, much less to discuss, I should make translation that all-important thing. One reason I must give. My freshmen, as a general thing, give me poor translations of even those passages that they understand thoroughly. Almost all of them have acquired a stock of words that they never think of using anywhere except in the Latin room; they employ idioms that they know are not English, and they have the habit so firmly fixed that I never succeed in thoroughly breaking it. Of course you all know what this translation jargon is, but I cannot resist the temptation to read you a little skit that is said to have originated with Professor Lane, of Harvard, himself a model in the matter of translation, though I imagine it has been greatly changed from its original form in the process of oral tradition:

*Concerning a youth who was unable to lie*

A certain father of a family to whom there was a sufficiently large farm, moreover a son in whom he especially rejoiced, gave this one for a gift on his

birthday a little ax. He exhorted him greatly to use the weapon with the highest care, lest it might be for a detriment to himself. The youth promised that he would be about to obey him.

When it was necessary for that one, on account of business, to seek a certain walled town situated not far, this one, the ax having been hastily seized, departs into the garden, about to cut down each most flourishing cherry tree.

That one, his home having been resought, inflamed with wrath, the servants being called together, asked who might have been the author of this so great slaughter. All were denying, when this one, running up to that one, "Truly, by Hercules," said he, "O my father, I am unable to lie; I, myself, cut down the tree with that little ax which thou gavest to me for a present."

The fault is due, in most cases, to simple carelessness on the part of the teacher; in a few cases to the effort to prevent the use of printed translations by insisting upon a so-called literal translation; in less degree to the confusion between reading Latin in its own order and translating it in that order. Every teacher ought to know, of course, that there is no such thing as a literal translation. The very phrase is a contradiction in terms. Every teacher ought to know, too, that a person who can read Latin in its order never thinks of English words at all as he reads it, and could not translate it as he goes along, even if he would.

But what is a good translation? I will give you my definition of the sort of translation that I should insist upon as the essential thing in the second year's work. A good translation is one that gives the exact meaning of the original in sound, idiomatic English, in such a way that the average pupil in the translator's class, having the Latin text before him, can trace each word or phrase in the translation to its source in the text. Next, how are we to get these translations in the class? I should make the review lesson the test of the translation, and should insist upon its being read off correctly and fluently in as little time as so much English would require. I expect the pupil to blunder in his translation of the advance, and I tell him so, but there must be no blundering, no hesitating, no repeating in his translation of the review. This fluent reading of the review can be secured easily, you will be surprised to find how easily, if the teacher treats the advance properly. Too many content themselves with interjecting corrections or improvements into the student's translation as he goes stumbling along. The objection to this is that it confuses the pupil who is reciting, and that it is impossible in nine cases out of ten for the class to put the boy's version and the teacher's suggestions together in such a way as to make them fit. A better way, because

less confusing, is to let the pupil give his own version, however faulty it may be, and then to criticise his rendering of the passage, commending what you can, amending what you must, and finally giving a coherent translation of the whole passage, free from all comments and explanations. When the entire lesson has been read in this way by the pupils and teacher, the teacher should read it all off to the class in the best English he can command and then insist that the review of the lesson the next day be as fluent and as smooth as his own rendering has been. I should make it a rule never to let the class leave the lesson until I had read it off in my very best style at least twice, and I should always be ready to read it again and again if asked to do so by any member of the class. I also urge my class to read their translation of the review over out loud before they come to the recitation room. If you teach translation in this way it will be a very definite thing to your pupils.

In the second place, but second with a great interval between. I should put the teaching of syntax. I think too many teachers do the grammar work, as we call it in Indiana, as it was done in the recitation that I have described. That is, when the pupil has translated his part of the text the teacher puts to him such questions on the syntax of the passage as are suggested by the text itself or the faults of the translation. I have three objections to this method, prevalent as it is. In the first place it interrupts the exercise of translation, which I think of greater importance, and distracts the attention of the class. In the second place such questioning is very apt to run in ruts, to become one-sided. I had a teacher once who always asked about ablatives of specification and subjunctives of characteristic, and when I was sure whether the word in question was noun or verb I always gave the right answer. In the third place it is hardly fair to expect the pupil to answer without warning the one thousand and one questions which may be put on any chapter of Caesar by a capable cross-examiner. To this method, as I have hinted already, I charge the positive aversion felt for Latin by many good but slow students. They are not so questioned in any other recitations. It was not good pedagogy, as I look at it, to make that little girl cry. The right way is to let the pupil know in advance just what questions you are going to ask him and give him a chance to look them up. I should do this by insisting that the class learn the notes on the day's lesson as thoroughly and as conscientiously as they translate the text. Then, when the translation has been finished in the way I have described, I should call up the next

boy and proceed to ask all the questions answered in the notes and absolutely no others.

But, suppose the notes pass over important points of syntax unmentioned, or the pupil's translation shows that he mistook the construction of certain words? That gives you your chance to do a little teaching in the form of declaratory sentences, sentences that are all too rare in second year teaching. Quietly call attention to the word and explain its use in the simplest way you can. Or, if you are wedded to the interrogation mark, save up these matters till you are done with questioning particular pupils on the notes, and then have a little general exercise, letting any one answer who can. This will be a safety valve for the smart pupil who likes to show off, and is often a pleasant change for everybody. This guards against one-sided questioning, against unfair questioning, and, taught in this way, the grammar work becomes as definite and precise a thing as a geography or algebra lesson.

The composition that always forms a part of the work of the second year should be made to serve two purposes in connection with the grammar work. For four days in the week it should follow closely the notes on the daily lesson, the teacher dictating to the class a few short and easy sentences that will fix in the pupil's mind the principles to which his attention is called in the notes. If the teacher lacks time to prepare sentences of his own he may easily select them from one or more of the many manuals based upon the Gallic war. The important thing to remember is that the sentences in most of these manuals are too hard, those intended for *viva voce* work being difficult enough for written exercises. For the fifth day the recitation may very well be devoted to such a systematic study of syntax, independent of the text, of course, as is given in any of the "old-fashioned" composition books, Jones's for example. In connection with this lesson I should urge a careful review of the declensions and conjugations; for this purpose I know of no plan so good as that followed by Comstock in the "General Questions and Practice" in his *First Latin Book*. I wish they could be printed off separately.

The other things that "go with Caesar" are, in my eyes, relatively so unimportant that I may pass them over very briefly in this discussion. Of course you must do something with the antiquities of the subject, but don't go in too deep. To understand Caesar's battles a boy must know something of the Roman art of war, but not nearly so much as most of our text-books tell him. You and I know very little

of naval tactics, but I imagine we read the story of the battle of Manila clear through without stopping to consult the dictionary or the encyclopædia. It is preposterous to worry second-year students with the order of promotion of the centurions in a Roman legion, or the calculation of the cubic feet of soil that a private soldier could get out of a ten-foot ditch with a wooden spade while a left-handed Gaul was slinging stones at him from the top of a ninety-foot wall. I should let such things take care of themselves. I don't want to make generals out of my boys; they are strenuous enough as they are.

Sight reading? Yes, by all means, if you have any time left after doing the other things. Select the sentences from the next day's lesson always. In this way you will get the undivided attention of the whole class as well as of the boy who is reciting, and the going over the matter the next day in the regular order of things will insure the accurate rendering of the passage. Let it be distinctly understood, however, that no pupil's class standing is going to be raised or lowered by sight translation in the second year, and remember that ten minutes practice in taking a sentence one word at a time by Professor Hale's method is worth half an hour of ordinary sight reading.

Finally, let me sum up what I have been trying to say: Make the assignment of work absolutely definite, so precise that the pupil may anticipate every question you ask. Preserve the emphasis throughout the year; don't shift it from term to term, much less from week to week or from day to day. Make good English translations the important thing. See that your own are good to start with, then lay stress on the translation of the review only, and you will do more than can be done in any other way to prevent your students from resorting to the coward's aid, a printed translation. Don't make a little tin god of the word "thoroughness": leave something for the pupil to learn the next day. Be thankful that he translates an ablative correctly even if he can't name it; you cannot name the first hundred ablatives in Cæsar the same way twice in succession, and neither could Cæsar. Lastly, don't make the little girl cry.

Assistant Professor W. B. Owen then read a paper upon "Some Recent Discussions on the Teaching of Greek and Latin in Secondary Schools." This was followed by Professor Capps upon the "Dependence of Greek upon Latin in the Secondary Schools."

The following topics were brought before the conference for



preliminary discussion, and committees were appointed to report at length upon these topics at the next conference.

(a) How can a larger knowledge of the ancient classical literature be insured to students in secondary school and college?

Committee: H. N. Herrick, the Robert Waller High School, chairman; Katharine Jones, the Hyde Park High School; Carolyn Parrish, the Lake View High School; Fannie R. Smith, the South Division High School; George H. Rockwood, the Austin High School; E. J. Kelsey, the Elgin High School; Katharine Reynolds, the West Aurora High School.

(b) Current literature and events of interest to classical teachers in secondary schools.

Committee: W. B. Owen, chairman; I. B. Burgess, Morgan Park Academy; Gertrude P. Dingee, the Hyde Park High School; Walter Comstock, the Englewood High School; H. F. Scott, the Indianapolis High School.

#### THE DEPARTMENTAL CONFERENCE IN HISTORY

R. C. H. CATTERALL, Chairman

Dr. J. W. Thompson read the report of the committee "to rearrange and adjust courses 1, 2, and 3 so as to make them conform as far as possible to the courses prescribed by the Committee of Seven, and also to the courses recently adopted by the best American universities and colleges."

The present requirements of the university are as follows:

1. The history of Greece to the death of Alexander.
2. The history of Rome to the death of Augustus.

The above examinations call for general information on the facts of Greek and Roman history, and a more detailed treatment is also required of one topic, chosen by the candidate from a selected list.

In the report of the Committee of Seven, ancient history is defined as preëminently that of Greece and Rome, but including also a short introductory study of the more ancient nations. In the history of Rome that of the early Middle Ages is embraced.

Mediaeval and modern European history is defined as the record of human affairs "from the close of the first period (*i. e.*, ancient history) to the present time."

The general recommendation of the Committee of Seven is as follows:

(a) For the classical course, one unit<sup>1</sup> of history, to consist of one of the four blocks<sup>2</sup> suggested.

(b) For the Latin course, the same.

(c) For the scientific course, two units, consisting of any two blocks.

(d) For the English course three units, consisting of any three of the blocks, or of two blocks and a combination of two others.

In discussing the matter the committee found two separate questions to consider.

First, the question of policy with regard to requirements: should the student be allowed a liberal option in choosing the field of work, the committee fixing the *number* of units, *not the subject* of the units.

Second, should the committee adhere to the present university view of what constitutes ancient history and general European history, or should it accept or modify the recommendations of the Committee of Seven.

The committee is of the opinion that it is advisable to adhere to the present exaction of classical history for all entering students, even in the case of bachelor of science and bachelor of philosophy students, as specified on page 55 of the *Annual Register*, 1900-1. The committee recommends, however, a broader definition of ancient history than that adopted by the University of Chicago, and one more in keeping with the report of the Committee of Seven.

The Committee of Seven defines ancient history as that of Greece to 146 B.C., and of Rome to 800, but including also "a short introductory study of the more ancient nations." In this light the present university requirement of Greek history to the death of Alexander and Roman history to the death of Augustus, is lamentably deficient as a survey of the classical period, and yet more defective, owing to its entire omission of the ancient Orient. The Hellenistic period of Greek history is ignored, save as it becomes a side-feature of Roman history, and the most authentic and valuable history of Rome (that of the empire) is omitted entirely.

It may be answered that there are two practical objections to the suggestion to extend Greek history back into the Orient, and Roman history down to the barbarian migrations:

1. Inability to cover the field in the time allowed.
2. The difficulty of procuring a suitable text-book.

<sup>1</sup>The term "unit" is defined as either one year of historical work during five hours per week, or two years of historical work during three hours per week.

<sup>2</sup>These four blocks are (1) ancient history, (2) mediæval and modern Europe, (3) English history, (4) American history and civil government.

The committee is of opinion, however, that time may be saved by abolishing the present practice of "special topics," and this is recommended. Moreover, the difficulty of securing suitable text-books which has hitherto been a serious one, seems now likely to be relieved.

In view of these considerations, therefore, the committee is opinion that the teaching of ancient history shall hereafter be made to include some knowledge of the old East, and be extended to 337 A. D.<sup>1</sup> We believe that with the abandonment of the special topic feature and the use of a good text-book, it will be practicable to extend the course to this point.

With reference to Courses 3*a* and 3*b*, the committee recommend that the alphabetical distinctions be abolished, and that in the future the subject be taught as a whole, no half-unit being allowed. This will entail some modification of the classification given to ancient history. The committee recommends that hereafter the unit of number indicate the unit of work, and that ancient history be designated as Course 1, to be differentiated into 1*a*, Greek history, and 1*b*, Roman history, a half-unit credit being permitted in these two cases only; as for 3*a* and 3*b*, that in future it be designated as Course 2.

The conference accepted the recommendations of the committee to abolish "special topics;" to extend the study of ancient history to 337 A. D.; to accept for entrance credit Greek and Roman history as modified by the report; to abolish the division between mediæval and modern history, and to count 3*a* and 3*b* as one unit.

Mr. Catterall submitted the report of the committee to consider the advisability of substituting some other arrangement for the present courses 4*a* and 4*b*, 5*a* and 5*b*, and to recommend text-books for use in these courses:

Without recommending, they suggest the following plan in reference to the courses mentioned: That 4*b* be so arranged that the student may offer work done on the periods 1492-1783, or 1783-1897; or the present requirement, for a unit's credit. In regard to 5*b* that the student may offer courses covering the periods 455-1485, or 1485-1900, or the present requirement for a unit's credit.

<sup>1</sup>This recommendation will cover *Botsford's Rome*, chaps. 1-XII, and xv. Chap. XIII, *The Divisions of the Barbarians*. Chap. XIV, "The New German States and the Empire of Charlemagne" will constitute the beginning of Course 1 in the University of Chicago, but it is yet within the option of teachers to cover the entire book and their students will probably do more satisfactory advanced work in consequence.

In regard to text-books, a number were named as being excellent, but no positive recommendation was made.

The conference rejected the suggestion as to courses 4*b* and 5*b*.

A committee was appointed to report at the next meeting on the question of teaching civics in a three years' course of history.

#### THE DEPARTMENTAL CONFERENCE IN MATHEMATICS

ASSISTANT PROFESSOR SLAUGHT, Chairman

This was attended by about ninety people representing some sixty different schools, including a goodly delegation from the university. Heretofore, the papers and discussions have been entirely upon matters connected directly with the work of the preparatory schools; but this time one of the papers dealt with the subject of modern geometry, quite independent of any direct application which might be made to the teacher's work in the schools. This paper by Professor Maschke, of the University, aroused much interest and enthusiasm.

The other paper, by Professor Myers, of the Department of Education, dealt with the teaching of secondary mathematics, and gave rise to active and prolonged discussion on the various propositions made. These papers in somewhat condensed form are given below:

#### SOME MODERN METHODS AND PRINCIPLES OF GEOMETRY

I am to talk today about modern geometry. The time at my disposal is very brief and the subject-matter very great, and so I have only a few points which I can present to you, although I do not suppose that everything I shall say will be new or unknown to you. I have also to ask your pardon if I am not so exact and rigorous in my statements in this summary report as I ought to be. You will allow me statements of this character: "*Bructerus mons omnes superat Herzyniae montes.*" This statement is all right for an ordinary human being, but not for a mathematician; for the *Bructerus* (*Brocken*) is a mountain of the Harz, and the above statement would make it higher than itself.

It might be said for the most important parts of recent geometry that one conception dominates everywhere: that is the conception of

the *group*. Suppose we are given a set of operations of any kind, which I call  $S_1, S_2, S_3, S_4, \dots$  finite or infinite in number—a set of operations which are defined by some law. Take now one of the operations, say  $S_1$ , apply it first, and after that has been done apply in succession another operation,  $S_k$ . If now it is so that the combined operation  $S_1 S_k$ , which is obtained by applying first  $S_1$  and  $S_k$ , is again an operation *in the original set*; and if this is so for any two operations of the set, then the set forms a *group*. Let me give you an example. Think of a sphere with center fixed, and define a set of operations by all the possible rotations of the sphere about its center. That is an infinite number of operations. These operations, I say, form a group. Revolve the sphere first about a certain diameter through a certain angle. This is one of the operations of our set. After that has been done, take another axis and revolve the sphere about this second axis through a certain angle. Then it can be proved that the combined effect of these two rotations is equivalent to a single rotation about a certain axis and through a certain angle. The effect produced by two operations of the set applied in succession is the same as the effect of another operation contained in the set. Therefore, all these rotations form a group. The number of operations in this group is infinite.

Suppose now we have a triangle with sides of two, three, and four feet in length. Whether we make an investigation about this triangle here in this room in Ryerson, or over in Cobb Hall, say, the result is the same. That means that in geometry we are independent in our investigations of the location of our figures in space. In other words, if I make a certain investigation of a certain triangle and then move that triangle to some other place in space, I do not change anything of the character of the theorem. Now, instead of saying that we will move our figure from one place to another, I will rather say that we move the whole of space by that same amount which will bring this figure into coincidence with the other figure; and so then the following statement will be clear: that our geometrical theorems are not changed when we submit the whole of space to a certain motion. The truth of our geometrical theorems is independent of the motion of space. If we consider all the possible motions of the whole of space, then these motions form a group, because the application of two motions in succession is equivalent to one single motion. Every motion can be considered as a transformation in the following sense: Suppose we take a point, and fix it by some means, say by its coördinates  $x, y, z$ ; then by any motion of the space the point  $(x, y, z)$  goes

into another point (say  $x'$ ,  $y'$ ,  $z'$ ); and so every point of space is *transformed* into some other point, and what we consider is this transformation, the connection between the points in the old position and the new position. Now, whenever the notion of a group comes in there is always the question of what remains invariant under such a group. If we subject the space to all possible motions, the most important invariant is the distance between two points. Take any two points, A and B; however you may move your space by translation, or rotation, or whatever you like, the distance between A and B remains always the same: it is an invariant. Also the angle between any two lines is invariant under this group of all possible motions in space. Of course these are not the only invariants. Indeed, every geometrical property—the theorem that the three perpendiculars at the middle points of the three sides of a triangle meet in a point, and all similar theorems—is independent of the accidental location of the triangle in space; all these theorems have an invariant character.

Let us go a step further. Take some triangle, ABC, and consider the symmetrical triangle  $A'B'C'$ —all sides and angles equal respectively, but lying in the opposite direction. It is possible to make them lie one on the other by a certain motion. Take the line of symmetry, and revolve the plane of the first triangle about this line; then this triangle will cover the other one. But such a motion is not possible if you allow only motion in the plane. Let us say the triangle  $A'B'C'$  is obtained from ABC by a *reflection* on their line of symmetry. In space, take a certain plane and reflect our figures on this plane. An irregular tetrahedron goes by such a reflection into another precisely equal to the first; but it is not possible by any *motion* in space to bring the two tetrahedrons into coincidence with each other. It is like the difference between the right and left hands. It would be possible to bring them together by mere motion if we could go into a space of four dimensions, but it is not possible in space of three dimensions; just as in the case of the two triangles, where it is not possible to bring them into coincidence by motion in a plane, but only by motion in space of three dimensions.

But now I say in our geometrical investigations it does not make any difference whether we consider a certain figure or a figure which is deduced from the first one by such a reflection.

: Let us consider all possible reflections in space on all possible planes. The question is, do they form a group? The answer is, no, because one reflection on one plane changes a given tetrahedron into

a symmetrical tetrahedron, and any other reflection on a second plane changes the second tetrahedron into its symmetrical tetrahedron, which is equal and equally directed to the first, so that by two successive reflections we do not get again a reflection, but something which is equivalent to a motion. If, however, we join to all possible motions of space all possible reflections, this totality again forms a group, because no matter how you combine any motions and reflections, you always get either a motion or a reflection: that is to say, you get again an operation of the set. What is invariant under this group? The distance between any two points, the angle between any two lines, and in the third place, every elementary geometrical theorem.

Again let us go a step further. Suppose we investigate a triangle with sides respectively two, three, and four feet in length. A teacher in Paris does not say *feet*, but twenty, thirty, forty centimeters—a different size; but the theorems which he deduces from his triangle are the same as the theorems which we deduce. In other words, for our elementary geometrical theorems the size is immaterial. We allow then an expansion or reduction in size, everything remaining similar, of course. To fix the ideas let us define such an expansion or reduction in this way: Take a fixed point, first, and join it to all points in space by lines called radii vectores, and change every radius vector, without changing the angles, in the ratio  $1:n$ ; the effect will be the expansion or reduction of the whole of space in size. Now let us join to all operations of our group containing all possible motions and reflections all these expansions and reductions; the combined operations form again a group, and this group has been called by Klein the *principal group* of geometry. Our geometrical theorems then remain true under this principal group: that is to say, they remain true if we apply any one of the operations of this principal group—any motion, any reflection, or any expansion or reduction in size.

If we ask about invariants, we see at once that under this group the distance is not invariant. But the ratio of two distances is invariant; it remains, of course, invariant for every motion and every reflection, and also for every expansion or reduction. The angle between two lines is also an invariant under the principal group. With this conception of the principal group we might give the following definition of the subject-matter of elementary geometry. We might say it is the establishment and deduction of geometrical properties which remain unchanged under this principal group.

Let me now extend this group by joining other operations, and



then we come right into the middle of modern geometry. Take any plane figure in space, on the board, for instance, and now take a point not in the plane of the board, and join this point to all the points of your figure: let the point be your eye, say, and let the straight lines be the lines on which you look upon the different points. If now you take a plane and place that plane in any position between the point and the board, then we get what is called a projection of the figure on the board on this new plane. If A is a point in the plane of the board, and O your center of projection, then let the corresponding point in the second plane be A', the point of intersection of the plane with OA; thus every point A goes into a definite point A'. How does this figure in the second plane differ from the figure in the first plane? Is the distance between two points preserved? Certainly not. Is the ratio of the distances of two points preserved? Certainly not in general. If you have the points A and B, and C in the middle of A'B', and project from the point O, the point C' will *not* be in the middle of A'B', unless the two planes are parallel. The angles between any two lines are also changed. But there is another thing which remains invariant—the ratio of two ratios. Take the line AB and divide it by C and D. Then

$$\frac{A \quad C \quad D}{B} \quad \frac{CA}{CB} : \frac{DA}{DB}$$

is invariant under this projection. This is called the *double ratio* or *anharmonic ratio* between these points. Also this projection, however, might be considered as a transformation of the plane. Take the second plane and place it on the first plane; then you have on the first plane a certain point A and its corresponding point A', B and its corresponding B'; so you have a transformation of the different points on that plane.

A similar transformation is possible in space; only to make that projection we have to take a point outside of space; that is, a point in the fourth dimension somewhere. From that point we project every point of our space into another three-dimensional space, and then bring that second space into coincidence with the first. Then you have the same thing—for every point A a new point A'.

Analytically this transformation is much simpler.

It can be shown that the coördinates  $x'$ ,  $y'$ ,  $z'$  of the new points A' are rational linear functions of the coördinates  $x$ ,  $y$ ,  $z$  of the old points A. From these formulas follows at once that all these transformations (they are called *projections* in the plane and *collineations* in space) form again a *group*.

Apply to the  $x'$ , etc., a collineation, and you get  $x''$ , etc., in terms of  $x$ ,  $y$ ,  $z$ , a formula of the same kind. And every formula of that kind gives a collineation. Therefore the totality of all collineations in space forms a group. This group contains the principal group, because every motion, every reflection, and every expansion or reduction can always be expressed by a formula of the above kind. This is the group of projective geometry.

Here the distance is not any longer invariant, nor is the angle, nor is the ratio between two lines; but the double ratio is an invariant, indeed the most important one of this group of projective geometry. The subject-matter of projective geometry is then the study of geometrical theorems which remain unchanged under this group.

There are many other possible transformations of space, and each is defined by a certain group. I mention the Cremona transformation, in which the coordinates of the new points are no longer linear, but rational functions of the old, and the old of the new. These transformations also form a group, and that group contains all the groups which we had before. Another very general transformation is the transformation which underlies the so-called *analysis-situs* — the investigation of all those geometrical properties which remain unchanged for every continuous *deformation*. By that I mean any deformation which is so that two points which are very near together remain very near together; such a transformation as is made by squeezing a rubber ball in your hand. This transformation is so general, one might think, that by this process we could change any figure into almost any other figure. But by squeezing a ring you can never make a sphere, and conversely, by that process of deformation you can never get a ring from a sphere. There are also several invariants under this transformation — the most important of which is the so-called *genus*.

So much about these transformations of space. There is another principle of modern geometry which I wish to point out in a few words. I have mentioned occasionally before the *fourth dimension*. Now this new principle I am talking of is the free use of all kinds of dimensions in geometry. I wish to give you an example of that. You know that in geometry of three dimensions there are only five what are called *regular* bodies: the tetrahedron, the hexahedron, the octohedron, the dodekahedron, and the ikosahedron. If we wish to represent these regular figures of space in the plane, we take a plane and a point outside, and project, *e. g.*, the ikosahedron on the plane.

Several of the projected edges will meet. But that can be easily avoided in the following way: Place the body under consideration on the plane, and take as point of projection a point above the middle point of one of the faces and not far from it, in such a way that the upper face is so projected that it includes all the other faces. Then we can avoid any intersection of edges. (The thus obtained projections of the five regular bodies were drawn on the board.) If only these projections were given, from these projections we could draw conclusions on the regular bodies themselves.

Let us do the same thing in the higher space. Take the space of four dimensions. It can be shown that in this space there are six regular bodies. Our imagination fails of course to see them, but we can see the projections of these bodies into our space of three dimensions. Take a point in the space of four dimensions properly chosen so that no meeting of the different lines occur, and then we get a projection into our space of three dimensions.

A body of four dimensions is bounded first by what corresponds to faces in the body of three dimensions — *i. e.*, by a certain number of bodies of three dimensions, in such a way that all these different bodies lie in different spaces; and every one of these is bounded again by planes, every plane by edges, and every edge by vertices.

A set of models from the mathematical department of the University of Chicago was shown in order to illustrate the projections of these regular four-dimensional bodies into space of three dimensions.

In reply to the question: "What is meant by geometry of four dimensions?" Professor Maschke said: Since we all are three-dimensional beings, it is utterly impossible for us to see in our imagination any space of higher than three dimensions. The study of higher spaces is therefore, and can only be, purely analytical. We might also treat analytic geometry of three dimensions in a purely analytical way, leaving aside all geometrical notions. In this sense analytic geometry of three dimensions is simply the study of functions of three independent variables  $x, y, z$ . This is, then, the answer to the above question: Analytic geometry of four dimensions is the study of functions of four independent variables  $x, y, z, w$ . But in this study we might borrow the phraseology from analytic geometry of three dimensions. We might talk of a plane, of a line, a point, a three-dimensional space in the space of four dimensions, meaning by these certain linear equations or systems of equations in  $x, y, z, w$ . One linear equation would represent a three-dimensional space,  $w = 0$ , for instance, the ordinary

space of three dimensions. Two linear equations in  $x, y, z, w$  would represent a plane, etc. Reasoning by analogy from three-dimensional space will help us then considerably in our analytic study in four dimensions.

In a certain way, however, also a direct geometrical insight into spaces of higher dimensions is possible. When we consider our ordinary space as consisting not—as we are accustomed to—of points as elements, but of straight lines, then it becomes at once a space of four dimensions, because a straight line is determined by four independent coördinals. And taking other simple figurations as elements of space, for instance, the sphere, the circle, the general surface of the second order, we might endow our ordinary space with any dimensions we please.

Professor G. W. Myers then read the following paper upon "Some Respects in which the Teaching of Elementary and Secondary Mathematics Needs Improvement:"

All persons having to do in an intimate way with mathematics are still pretty clearly divided as to their pedagogical views into mathematicians and mathematical teachers. The first class is not numerous; though it is made up of a very select and an extremely exclusive membership. On the contrary, the second class is very numerous, but neither so select nor so exclusive. While modern altruistic views of education would seem to require all mathematicians to be mathematical teachers, and while sound educational policy would seem to demand that all mathematical teachers should be in a sense at least mathematical investigators, still the writer has no disposition to criticise the reason for the existence of a rather sharply defined line of demarkation between two such classes. He would be understood to be merely stating a fact which anyone having the disposition can experience no difficulty in verifying.

Again, pursuant to the tendency of the mathematical mind to analyze and classify, we may subdivide the second class into three pretty well-defined schools. First, there are the mathematical teachers who look upon the question of the teaching of mathematics as fully answered in fixed and final form. Trace these teachers to their lair, and you nearly always find that finality has been reached through their own artificially prepared remedies in the form of some superficial methodology.

Then there are those who would have us think that a mastery of

subject-matter is a sufficient guarantee of professional efficiency in the mathematical teacher. If it were necessary to accept the alternative of identifying one's self with one or other of these two schools, the latter would be preferable. But fortunately there is still a third possibility.

There is among us a growing number of persons who occupy a middle ground between these two extreme positions. These persons distinguish between the doling out of popular catch-phrases and a sincere restudy of subject-matter, already familiar, with reference to the way in which the immature learner must proceed to its mastery. It is to this class of persons who believe in the possibility of improvement upon current mathematical teaching, persons who have both a mathematical outlook and inlook, who have both a prospect and a retrospect, that the remarks of this paper are addressed. To any others it would be useless to talk, for to him who sees no prospect of improvement, there is no possibility of improvement.

And now that I have defined my audience, I will proceed to the more specific purpose of this paper.

As to the mathematical work of the elementary school considerable must be said. I shall, however, discuss the changes to be desired in it only so far as they are organically connected with the work of the secondary school in mathematics. My remarks will accordingly be confined mainly to the improvements urgently needed in the last two grades of the secondary school.

Unless a stronger reason exists for the retention in the arithmetics of the long array of topics usually taught under the head of advanced arithmetic the following subjects, if well mastered are quite sufficient for the distinctive work of pure arithmetic: The four fundamental operations; the facts of the tables of denominate numbers, taught through using them in the teaching of the fundamental operations; common and decimal fractions and the principles needed for their use and reduction; G. C. D. and L. C. M. taught as a means of transforming and reducing fractions; percentage and simple interest. Good teachers can easily secure a thorough working knowledge of these foundation principles and operations, together with a considerable fund of geometrical ideas and no inconsiderable quantity of algebraic generalizations in less time than is now generally assigned to arithmetic. It is even maintained that this can be done without jeopardy to any of the other work of the grades by the end of the sixth school year. This leaves the seventh and eighth grades clear for

some serious work in elementary geometry and algebra and makes possible the completion of some things to such an extent that they need not be gone over again in the high school. Enough of these subjects could thus be taught to bring their more powerful methods of treating problems within the reach of the great numbers of pupils (fully 95 per cent. of those who enter school), who for reasons over which they have no control, can never hope to avail themselves of the advantages of the secondary school, much less of the university.

In all this elementary work I would have practical considerations the guide in selecting both matter and method. I would have the range and variety of subject-matter so great as to convince the pupil, whatever his tastes might be, that a mastery of the mathematics would be a powerful aid to him in reaching the ends in life which seem important to him. I would not hesitate to choose subject-matter whose importance consists in its utilities. I would not fear doing violence to that peculiar and fortunate mental attitude which predisposes the possessor to the pursuit of pure mathematics as a vocation, for I cannot conceive of the prospective specialist in pure mathematics loving his science any less because it is capable of a many-sided usefulness to many people whether they be prospective mathematicians or not. The contention that the elementary mathematics should be presented largely through its applications to problems which commend themselves to the pupil himself as being practical and valuable, is not, as some would have us believe, at odds with those who advocate the pursuit of a branch of science for its own sake and argue that pure mathematics ought to be studied with no view to its application. Those who take the latter view are far from claiming that all mathematics must be pure mathematics in the close technical sense. All admit that the surest progress in the pure mathematics is made by those who have laid for themselves a broad and stable foundation in the concrete world, for to this world they must frequently and for a long time return for illustrations and exemplifications to steady their steps through the abstractions of pure mathematics. As a matter of fact the habit of concretizing an abstract problem is an excellent one for even an advanced mathematical student, since through its exercise he is able to lay firmer hold on abstract ideas. Vaguely conceived abstractions are weakening to the pupil, as they produce the pernicious habit of feeling satisfied with half-defined notions of things. Such habits may result in a sort of rosewatery intellectual mist, admirably adapted to the making of adult commentators upon what others have

done, where truth and intellectual honesty are qualities of secondary importance. But such habits are fundamentally at war with whatever makes for clear and forceful thinking without which substantial progress, both material and spiritual, is impossible for either the individual or the race.

Again, a good general caution to follow in mathematical teaching is never to allow a sharp line of demarcation to separate a subject from the subsequent subject for which it is to prepare the pupil. The roots of the new subject must be carefully buried in the soil of the old before the old is left behind. Frequent returns to the old for analogies and reasons for extensions of ideas must be kept up for a considerable time in the prosecution of the new study. Arithmetical work should not, therefore, be dropped abruptly and once for all at the close of the sixth grade. On the contrary, the seventh-grade work should be well-nigh altogether transitional between the previous and the subsequent mathematical work partaking somewhat of the character of both. The point to be borne in mind is that the seventh-grade work in arithmetic should lay the basis for elementary algebra and geometry, and should suggest the needs and means for teaching the more general methods of dealing with quantitative relations of things and phenomena. Elementary algebra and geometry should constitute the center of gravity of mathematical effort of the eighth grade, and the emphasis of attention of both teacher and pupil should be upon it. The arithmetic should be distinctly subordinate to these subjects.

The three lines of work must be so interwoven that the distinctive methods of each subject may appeal to the pupil as being merely different modes of dealing with the same subject-matter—merely different points of departure from which the same thing is to be done—the algebraic and geometrical modes growing out of the mental necessity of dealing with more comprehensive relationships than the limitations of the arithmetical mode will admit.

Problems should be drawn largely from science, mechanics, and the social industries, and should deal with real conditions. The reason for this is that the pupil should be led both *to sense* and *to see* the reality of the need of mathematical knowledge and skill in getting control of his environment. Geometrical drawing should find a place. The elementary notions of descriptive geometry ought to be included in the pre-secondary mathematical curriculum, and even the formal demonstration of propositions by the *quasi*-experimental method of



superposition should not be excluded, though only the beginnings of deductive reasoning should be attempted. Actual measurements from the surroundings and from the laboratories should be extensively used.

Money problems should be curtailed, to the end that the pupil may come to feel that there is much mathematics will aid him in doing besides making change and keeping accounts, neither of which ever has involved him in serious difficulty, nor is there any high degree of probability that they ever will. The thing most needful to the pupil to bring him to a point where financial questions are likely to assume a complicated aspect is a modicum of general good judgment; and the continuous treatment through the secondary school of artificial conditions and isolated problems do little toward the training of this prime mental attribute.

As to the work of the secondary school, much ought to be said of the manner and kind of improvement needed. Time limitations prohibit more than running suggestions. I believe the general introduction of what the English call Euclid into our secondary schools would be a monumental misfortune. Every argument against this sort of study of geometry which applies to English conditions—and their name is legion—holds with greater force under American conditions. But let us begin with an inventory of mathematical attainment, with which, under proper teaching, the pupil would enter upon his secondary work.

His work in geometry should have begun at an early stage. The writer does not believe the kindergarten is too early. He hastens to say, however, that most of his colleagues criticise this position; though there are few exceptions to the statement that the critics are generally hostile, most of them avowedly so, to any sort of mathematical work which necessitates the study of quantitative relationships as subject-matter of *special* thought. This draws some of the most painful shafts of the criticism.

Once begun, the geometry should be kept up—not necessarily on every tenth page of the text-book—to and through the eighth grade. Here it constitutes the bulk of the mathematical work. By the end of the grades a considerable knowledge of the uses of geometry should have been acquired, together with a degree of familiarity with geometrical figures, both plane and solid, and of their more useful properties and relations; a degree of intelligent skill in inductive reasoning, a working knowledge of similarity through the plotting to scale of field measurements with home-made and inexpensive apparatus; and

a fair understanding of the method of establishing equality by superposition of figures.

Under the foregoing plan, in algebra the pupil may be assumed to have a good idea of literal number; of the way literal number may be used to facilitate analysis, whether he is or is not concerned to know results in arithmetic numbers; of simple equations in one and two unknowns, together with some idea of how to use them advantageously in the solution of problems which would be difficult by arithmetic. He will have sensed, if not seen, that algebra proceeds along the line of generalizations from arithmetical number and processes, and that one of its great advantages consists in the possibility it affords of retracing the steps in an argument, or a computation so as to determine, at any stage in the solution, how a number has been obtained, whereas in arithmetic we "cover up our tracks" so that we lose sight of the origin and nature of our numbers. If the pupil has been trained from the first to translate his equations into verbal language, and *vice versa*, he will have learned to look upon the equation as the symbolic expression of a law of nature, or of number.

The writer does not believe it impossible to give the eighth-grade pupil a working notion of variable number, not in a didactic way, but through the graphical representation of simple equations, expressing laws of nature the meaning of which is within his easy comprehension, and to give some training in the interpretation of the graphs in terms of natural facts and phenomena. All of this means that teachers of mathematics should seek to give this subject a sociological aspect.

Up to this point the method of dealing with the pupil should be first to question the ideas into the pupil and then to question them out of him. So far as possible it is well to keep up at least the "illusion of discovery." The over-working of the pedagogical maxim, "Never tell the pupil anything," like many of its fellows, has, however, been made to do great injury to the pupil.

The teacher of secondary mathematics should avoid beginning his subjects, after the fashion of many of the texts, with a lengthy catalogue of the differences between the new study and what he has been studying in the grades. The essential unity rather than the accidental differences of the subjects should be impressed upon the beginner's mind, though not so much by precept as by example. One great advantage of this is that the pupil is not so terrified with the thought that the new subject is something wholly unlike anything with which he has hitherto had to do, so that he attacks the difficulties of the new

subject with a greater degree of confidence, feeling that his feet are planted on the firm ground of something he knows. Furthermore, what differences do exist should be shown to be of the nature of extensions of old and familiar processes to an extended realm of number concepts, first to the inclusion of negative numbers, then of irrational numbers, and finally of imaginary numbers. The analogous extensions of arithmetic processes, from positive integers to fractional numbers and to such irrationals as are met in the attempt to extract the square and cube root of imperfect squares and cubes, may be cited with great profit by a teacher who has an outlook, and let us hope that such teachers will rapidly become more plentifully available for secondary and elementary mathematical work. In the use of such ideas teachers of secondary mathematics particularly, if they be of the sort who have felt the "divine intoxication of learning," can communicate to their pupils the genuine spirit of mathematical study, and, after all, this is the important thing to impart.

It is believed that if geometry were taught as an outgrowth of some seven or eight of its trunk principles, much more satisfactory results could be secured than are reached by the common method of subdivision of its subject-matter into books with reference to the forms of the figures to be dealt with. For example, it is of decided advantage to the student to have learned from experience that when he has to establish the equality of any two figures, he may nearly always accomplish it by properly superposing them and noticing, or proving, that they coincide throughout. When this method of proof is mastered the mind of the learner has secured a point of view for attacking an extremely large class of demonstrations. Recourse is thus gained to a general method of procedure which deals successfully with about 20 per cent. of the proofs of plane and solid geometry. To keep the pupil in the dark unnecessarily, merely for the sake of having him struggle for the light which a mere intimation from the teacher might furnish, is to require the pupil to repeat in his own experience the experience of the race, as though the race had not had this experience. Such educational practice is reactionary. The ideas of economy of mental resource and of the greatest rapidity of progress consistent with stability, are ingrained in the Anglo-Saxon make-up, and to compel the American boy to keep swinging on the gate of elementary mathematical method after he is able to make pleasurable and profitable excursions into the higher fields, is to go far toward making him what the English call a "stale" man.

As a corollary to this principle, it is well to draw attention to the fact that the usual method of proving the equality of lines and angles is to make them parts of rectilinear figures and to apply the general method of superposition to these figures.

The propositions which relate to inequality should be gathered together and examined with a view to the discovery and statement of the organizing principle for establishing inequality.

A third principle is that involved in the measurement of angles whose sides and vertices have been brought into certain relations, as to position with reference to the circumference of a circle. This finds extended application in the study of the properties of lines and angles which may be brought into such relations to the segments of circles. A large class of cases depends upon this principle, and it is not difficult to generalize the principle from them, once they are gathered together under this point of view.

A fourth is the principle involved in establishing parallelism and similarity, which should be mastered so far as to meet the need of practicable applications without any reference to whether the parallel axiom is necessary, or tenable, or anything of the sort, and applied to a sufficiently great number of special cases to make the pupil appreciate its broad applicability to practice, and its general usefulness in both theory and practice.

The principle of the resolution of plane figures of all sorts into the triangle is well known by all to be of fundamental importance; but not more than half of the students who have completed the high-school course in geometry seem to get hold of it. Only a few weeks ago a mathematical teacher who has been in the harness for at least ten years asked me the surprising question: "What do you mean by saying the triangle is the fundamental plane figure?" This teacher soon betrayed the fact that she regarded the oblong, or rectangle, as the fundamental plane figure; I suppose because it ordinarily comes first in the chapter in arithmetics on mensuration. A sad commentary on the weaknesses of a teacher who has no outlook!

The principle of limits ranks high in the scale of importance among the central principles of geometry. I do not believe that more than one pupil in ten gets any adequate notion of this principle in the high school. If all the propositions depending upon it were gathered together and reviewed in the light of it, the principle would not be difficult. I do not agree with some that it should be postponed altogether until the university period. This would exclude a large

number of pupils from even a limited acquaintance with a very powerful method of dealing rationally with a large class of important problems.

The principle of analogy of two-dimension and three-dimension space relations may be invoked with great profit very early in the course. If it be admitted that for the sake of the student who is to use his mathematics in the physical, mechanical, and engineering sciences, the policy of allowing him to accept the truth of many propositions partly by analogy, partly by trial, and partly by faith is good policy, this principle can be appealed to not a little. To illustrate, when the pupil has proved the parallel proposition for lines and angles, he will see intuitively the truth of its space analogue for planes and diedrals, by merely drawing his attention to it.

The principle of the reduction of space geometry to plane geometry by the analysis of figures will orient the pupil with reference to nearly all the propositions of solid geometry.

All of us seem pretty well agreed as to the high value of what is commonly called *inventional geometry*. Most of us agree that one demonstration carefully thought out by the student is worth more to him than ten committed demonstrations. Suppose now that from a limited number of special cases exemplifying these organizing principles the student should be led to generalize them and then to verify his generalizations by confronting them with a few more special cases. Then suppose all the rest of what is commonly given in the course in geometry were to be put as exercises under these central principles. Would not such a method of presenting geometry stand for as much or more intellectual training, and for more power in the use of mathematics, than does the common text-book procedure?

But if we cannot bring ourselves to a willingness to break away from common practice so completely as this, can we not admit that this would at least be a good plan on which to conduct a final review? This question is strongly urged upon secondary mathematical teachers.

As to secondary algebra also much ought to be said if time would permit. In the first place, I advocate the abandonment of the attempt to teach secondary algebra with a view to making it a study of functions, or primarily an introduction to such study. I would have the weight of the pupil's attention on the equation and how to use it in the solution of practical problems, the drill on the solution of abstract functions coming in mainly as a means of enhancing the pupil's skill in handling such equations as occur in those branches

of science which make real demands for algebraic knowledge and skill.

I would in the second place advocate, for algebra as for geometry, a subdivision of the subject-matter more with reference to a small number of central principles. I do not believe in the educational value of the schoolman's tendency

To sever and divide

A hair 'twixt north and northwest side.

Thirdly, I am a believer in the early and continuous use of graphical representations for the reason that it is as well worth while to calk the joints of a leaky thought fabric as of a material fabric. I would not preface the construction of curves with a mass of definitions from analytical geometry; nor with a philosophical exposition of the possibility of drawing graphs to represent equations. I would draw graphs much as the fabled farmer raised potatoes. I would simply draw graphs.

The study of algebra, first, with emphasis upon the technique, and then again with emphasis upon the thought, ought to be discouraged; because skill in manipulation built upon either ignorance or faith in the existence of an adequate, though unseen, reason, or in any other way than upon a clear and cogent reason for it, is almost certain to produce shallow thinking. So far from discouraging the attempt to secure skill, I would emphasize it; but not at the risk of crippling the pupil's power of analysis, nor of fixing upon him the habit of being content with a rule-of-thumb knowledge of technique, without troubling himself with the *rationale*. Moreover, experience leads me to believe that both the thought and the technique can be more quickly and more adequately mastered than can technique either alone or with but secondary emphasis upon thought.

The presentation of the theory of exponents should lead the pupil to see that the order of reasoning is to assume the general tenability of the four fundamental exponential laws from a knowledge of their tenability for positive integral exponents, and then to interpret the meaning of fractional and negative exponents consistently with this assumption.

The text-book in algebra should be copiously illustrated, and the matter placed upon the page in such a way that the eye may readily catch the important ideas at a glance.

I would discourage the lecture method of imparting instruction to secondary mathematical classes

Better results may be attained by a competent teacher in both algebra and geometry by teaching these subjects abreast, even if time limitations reduce it to running a three-hour-a-week course through the first high-school year and a two-hour-a-week course through the last year before leaving the high school. In such event the last year's work should consist largely of trigonometrical work, which should have begun long before the algebra and geometry are completed. But mathematical expertness and insight are a growth, and there should be no period in the secondary school during which the study is suspended.

All through the work of the secondary school the largest importance should be given to practical considerations, on the hypothesis that the best definition for the elementary and secondary pupil is that "mathematics is the abstract form of the physical sciences." By this I do not mean that I would have the pupil in these grades have nothing to do with abstract work and ideas; but rather that the abstractions, so far as taken up, should grow out of practical questions relating to the concrete world. I would do this because, while I am more interested in making a mathematician than in producing any other form of specialist, I am most of all interested in doing what I can in the production of useful average citizens. We may all safely assume that the bulk of our pupils are candidates for this category. This method of procedure will do no harm to the thousandth student whose mental processes fit him for the peculiar work of the pure mathematician, while it will do great service to the 999 to whom practical questions make a stronger appeal than abstract matters, at least during the immature period of the high school. I believe most confidently that this method would curtail the mortality lists of the pre-university period and bring a much larger and finer assortment of material to the universities from which to select the pure mathematicians. With the larger number of specimens there would be all the more chance of finding the fish with the golden coin in its mouth. While the policy advocated by this paper may seem to make mathematical work play a subordinate part in education, I feel that this is but another case in which the servant finds his life by losing it. If it can be shown to the young pupil that a mastery of mathematics means the enhancement of his power an hundredfold in whatever line he seeks advancement, he will not shirk it as he will when he feels that the main reason he should study it is to discipline his mind. Still I would not for a moment advocate a presentation of mathematics which does



not make proper provision for the element of mental discipline. It is too remote and abstract an ideal, however, to make a strong appeal to the immature pupil. The rational handling of real problems cannot fail to secure the necessary mental discipline.

Finally, I may confess that I suspect most of the mathematical ills that now afflict elementary and secondary teaching would be greatly relieved, if not cured, by the influx into these grades of school work of a large number of well trained and ambitious men and women. I hope to see the day when it will be the rule, rather than the exception, to find at the head of the work in each grade above the sixth a man or woman who has had enough interest in the higher training of the mind to have pushed his or her studies at least as far as the bachelor of arts degree in a good institution of learning. This will insure the teacher the much-needed *margin*, without which no teacher can do his best service, and no true teacher is ever satisfied to do less than his best. Furthermore, elementary and secondary teachers cannot much longer excuse their lack of training on the grounds that many university trained persons fail to make good teachers. The day is not far distant when it will be a generally recognized fact that the function of the university is not to furnish the steel, but merely to put an edge on what is furnished. Pewter will not then be expected to furnish the same results as steel, even if both metals are put through the same course of treatment. The deprecation of university training will soon come to be "seen in its true nature," as merely a ruse to disarm deserved criticisms upon the critic's self-imposed shortcomings, for there will soon be no good reason — if, indeed, there is now a good reason — why anyone by the exercise of a little determination and self-denial need forego the advantages of a university education. It will then be recognized that he who has the steel and fails to give it an edge is more deserving of censure than he who having but an inferior grade of metal has done his best to make it useful. May this day speedily come!

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